

War Machine | Addonics Quad-CF | Asus P5E3
M1 Elite | PCI Controller | Premium

cpu

COMPUTER POWER USER



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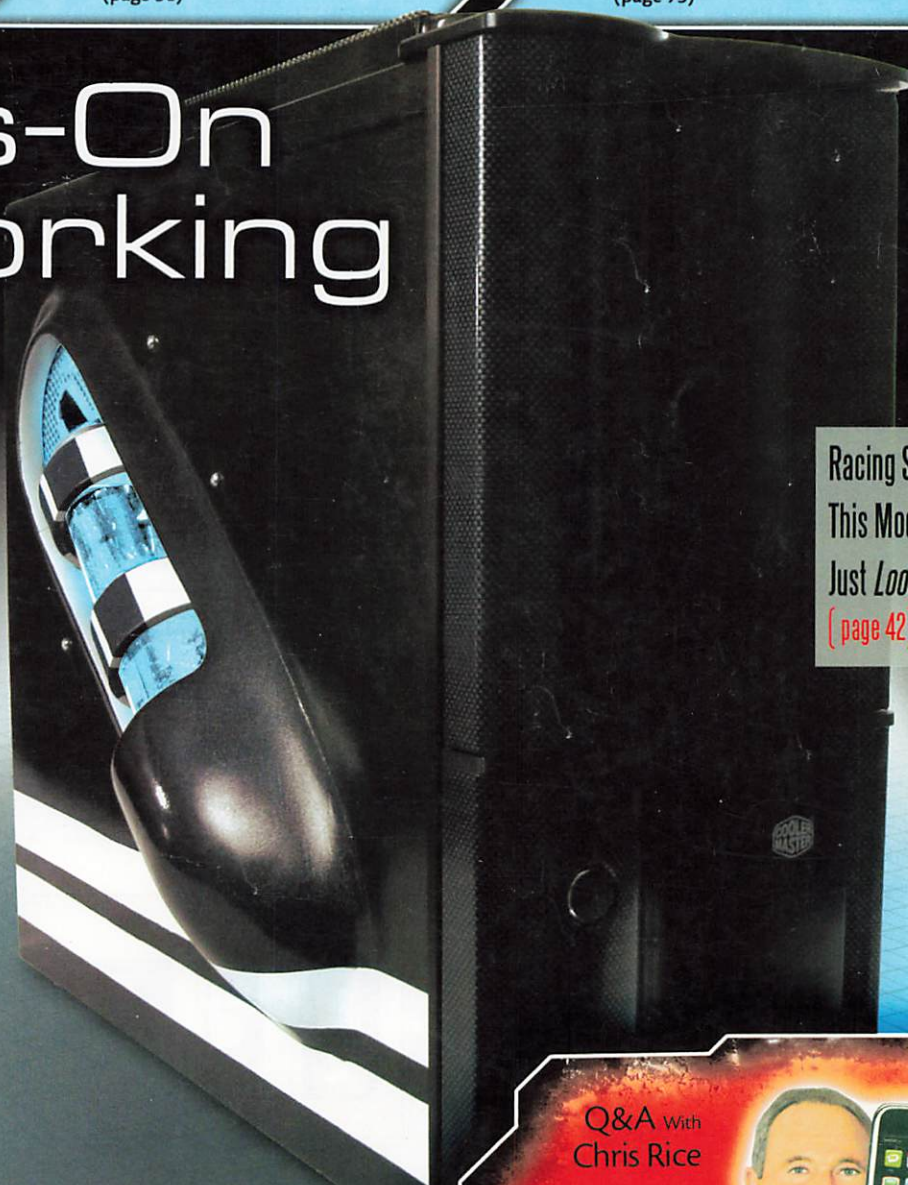
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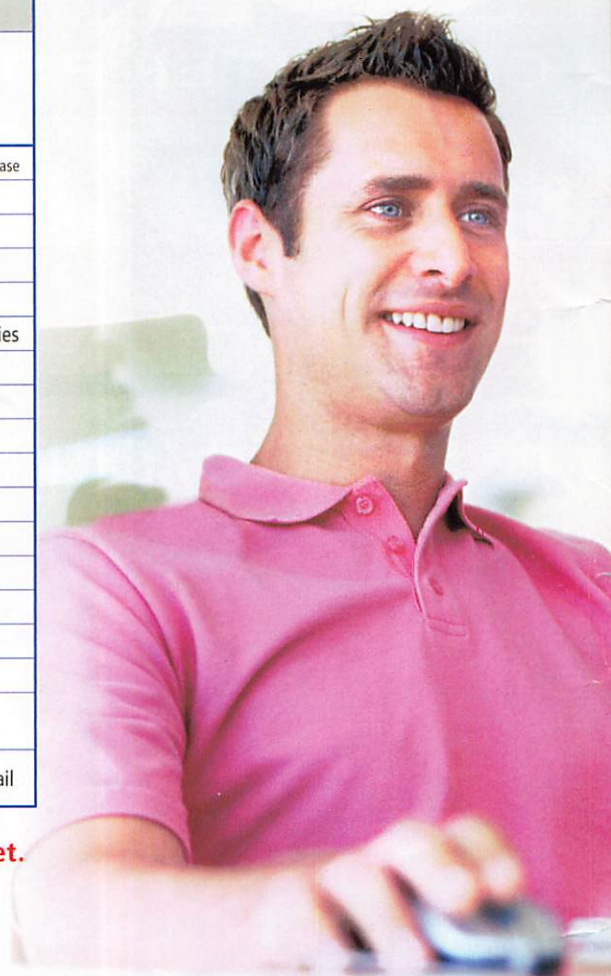
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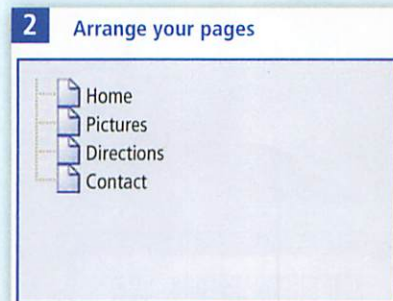
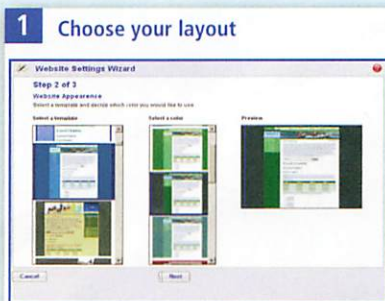
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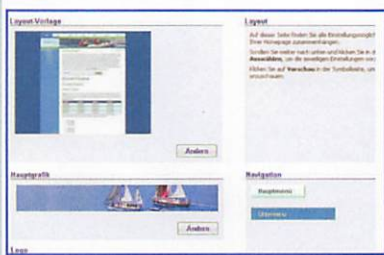
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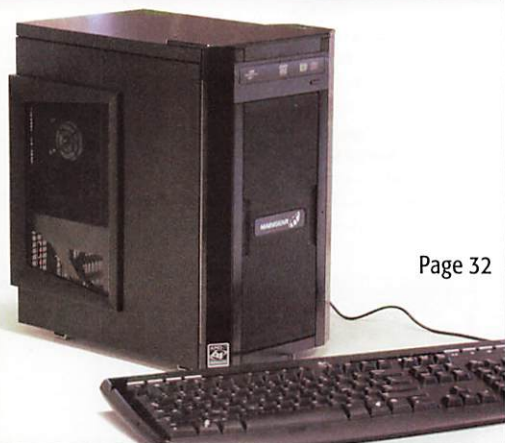
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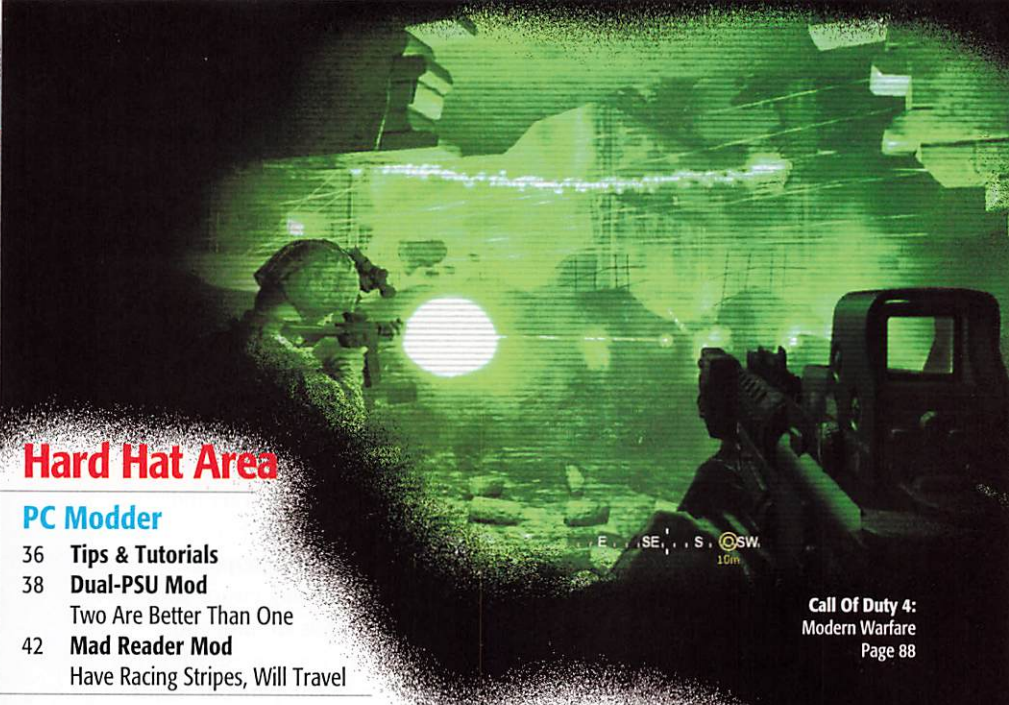
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CORRECTIONS:

On page 53 of the December issue, we incorrectly stated the stock clock speed of the Intel Core 2 Quad 6600 as 2.66GHz. The Q6600 has a stock clock speed of 2.4GHz.

Infinite Loops

Strange stats and other oddball items from computing's periphery

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EDITOR'S NOTE

Brand loyalty. An interesting concept, isn't it? You don't have to go too far out of your way to see it every day; people espousing the virtues of Brand A or decrying the shoddy products of Brand B with almost religious fervor. Whether you're talking about processors, video cards, power supplies, memory kits, videogame consoles, home-theater equipment, cars and trucks, clothing, or fast food, if you proclaim your brand to be the best, people will fall all over themselves to offer either corroboration or a counterpoint.

Some of this, of course, is simply a product of humans being creatures of habit. We find something we like, get comfortable having it around, and before you know it, the rest of the market may as well not even exist. And, because we're also intensely social beings, we're driven to compare our habits to those of the people around us. I get that, and I've certainly been in that boat myself a time or two.

So long as the brands we're championing hold up their end of the bargain and serve us well, no harm is done, although we may occasionally miss out on opportunities to experience better stuff along the way as a result. But every now and then, you come across folks who doggedly cleave to a brand or product that deserves no such devotion, and even if you can clearly demonstrate the folly of their ways, they'll have none of it.

Such blind fandom benefits no one but corporate marketers: It certainly doesn't do the fanboys themselves any good. Interestingly, these poor souls are often also the most vocal proponents of their chosen brands and the most vitriolic detractors from all others. Long, rambling forum posts dripping with bile ensue, feelings are hurt, and passersby are scowled at.

I propose that we adopt a new flavor of brand loyalty, one that treats the companies that provide our toys, tools, food, and so on with a dose of friendly pragmatism. One that says (for example), "I like how your CPU performed in my last system, so I'm going to give you a real shot at being in my next build, as well. But I'm going to look around at my options, and if at the end of the day your competitor can provide a better blend of performance and value, I will seriously consider a change."

If what I've described sounds a lot like common sense to you, congratulations! You likely enjoy your purchases more fully than more parochial shoppers, and you will seldom have to look back and wonder if you missed out on something really good. Also, you're probably very handsome. And witty.



Chris Trumble, Publication Editor, CPU



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Authorization For Reprints

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Fax: (402) 479-2193

Editorial Staff

editor@cpumag.com

Fax: (402) 479-2104

131 W. Grand Drive

Lincoln, NE 68521

Subscription Renewals

(800) 382-4552

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Advertising Staff

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120 W. Harvest Dr.

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QuickPod Gives Your Digicam A Boost



If we had a nickel for every time a Shaq-like giant ruined a good photo op by planting his oversized body in front of our camera, we'd be, well, Shaq-like rich. Enter the QuickPod (\$49.95), a 53-inch extension of the shutter button that's ideal for taking self-portraits or making Shaqs a non-factor. The polycarbonate extender works with D-SLRs, retracts to 18 inches, has a quick-release mount, and weighs just 9 ounces. It even includes a built-in mirror for those vanity shots. You also get an adapter that turns the QuickPod into a monopod, wrist strap, carrying bag, and hiking clip. Take that, Shaq. ▲



Rambus Plans For A 1TBps World

Rambus detailed in December at its developer forum in Japan its Terabyte Bandwidth Initiative, which entails "new memory signaling technologies useful for the development of a future memory architecture capable of delivering a terabyte per second of memory bandwidth to a single System-on-Chip." Rambus says keeping up with video consoles, PCs, and other devices in coming years will require such speeds. To that end, it's working on such new innovations as a 32X data rate (32 data bits per input clock cycle on each I/O); FDMA (Fully Differential Memory Architecture); and FlexLink C/A, the industry's first full-speed, scalable, point-to-point command/address link. Rambus has reportedly constructed a prototype to test the technologies, which it believes will start coming in handy around 2010. ▲

Dell

Takes Its Business In New Directions

Dell did two things in December to pretty much cover the entire consumer enchilada. First, it cut a deal to sell its systems at 900 Best Buys, hitting the low and midrange buying sectors. Second, Dell started shipping special-edition Horde and Alliance World of Warcraft-themed XPS M1730 notebooks, thus hitting the coveted high-end gaming sector, where gamers will of course pay major bucks for a major-league rig. Beyond bundling the 17-inch notebook with slick WoW artwork, buyers get a WoW-themed backpack filled with enough swag to break a back (beta keys, making-of DVD, etc.) and up to 3.4GHz Intel Core 2 Extreme CPUs, Ageia PhysX cards, 512MB SLI Nvidia cards, HD widescreen display, and plenty more. Not a bad month's work. ▲





Haier America Expands Beyond Dishwashers

Don't let the wine cellars, fridges, washing machines, and dishwashers at Haier America fool you. It also sells a damn versatile MP3 player. The \$329.99 30GB Ibiza Rhapsody has integrated Wi-Fi and A2DP and AVRCP Bluetooth support, and its 2.5-inch screen (320 x 240) plays MPEG-4, WMV, H.264, AVI, MPG, and M4V clips, plus AOL videos you can wirelessly download to the player free. AAC, MP3, WMA, and WAV audio is doable, but there's also integrated Rhapsody support (Rhapsody To Go is free for 30 days) and an FM tuner. Want more? How about automatic wireless podcast updates, a choice of five colors, and customizable screens and content via AirSkins. Oh yeah, 4GB (\$229) and 8GB (\$249) flash versions are also available.

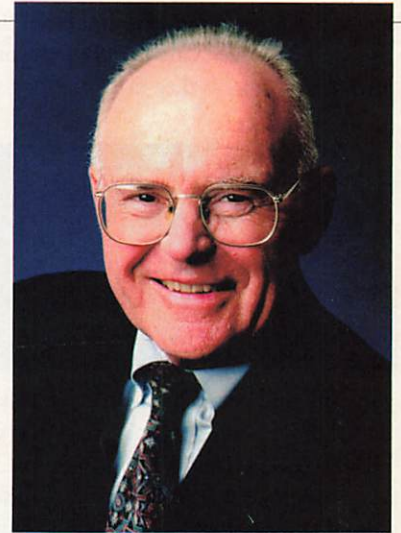
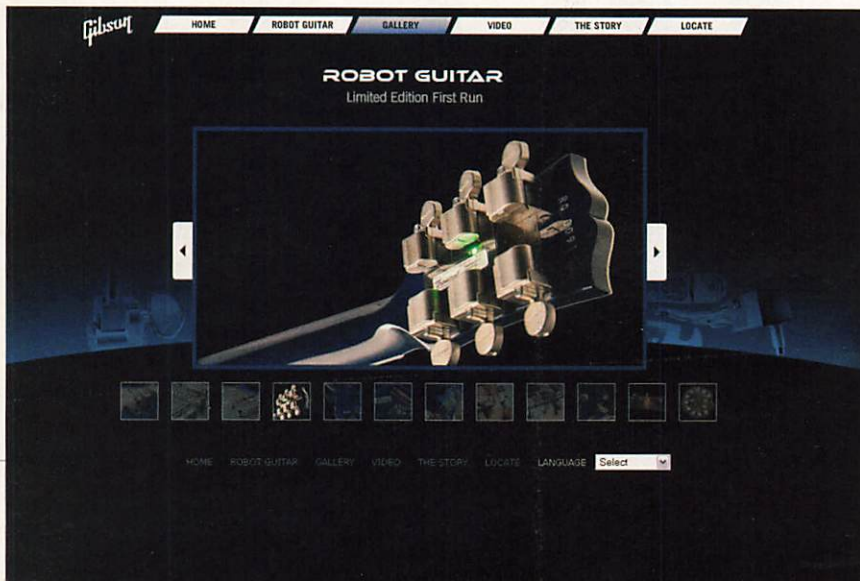
Hardware Mole

Samsung Sets Its Sights Big & Small

Shush. Hear your portable devices shrinking? No? You will soon, as Samsung was set to detail at CES a 1.3-inch hard drive. Though there was no word on capacities at press time, 80GB iPod nano-sized music players sound pretty sweet. Don't fret, discriminators of all things small. Samsung was to also introduce a 3.5-inch 1TB RAID Edition drive and a 2.5-inch 320GB drive at CES. Elsewhere, Samsung has reportedly finished work on its GDDR5 DRAM implementation, calling it "the world's fastest memory" with mind-boggling 6Gbps transfers. First out of the gate will be 512Mb chips (16Mb x 32), with 24GBps total bandwidth expected in early 2008. ▲

Tech For Hobbies & Health

Physical therapists are turning more frequently to the Wii to help bring patients back to better health. According to Reuters, Robbie Winget, occupational therapist at Dodd Rehabilitation Hospital at Ohio State's University Medical Center, has been prescribing 30-minute Wii workouts for stroke, spinal cord, and brain injury patients up to three times a week. Meanwhile, Gibson is now making life easier for six-string aficionados via its self-tuning Robot Guitar (\$2,499 vs. \$1,400 for a standard Les Paul), which only requires spinning the Master Control Knob to a desired standard or alternative tuning, strumming the strings, and letting the Robot do the rest. "Iron Man," indeed. ▲

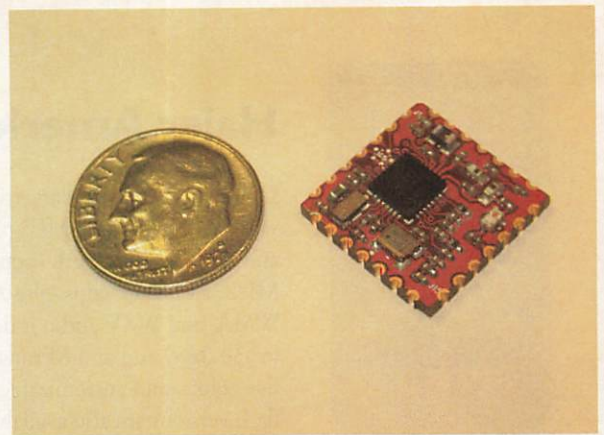


Gordon Moore's Stargazing Gift

We have much to thank Gordon Moore for, and so does the California Institute of Technology and University of California—200 million reasons. That's the sum Intel's founder donated to the schools to help build the Thirty-Meter Telescope, which has an estimated \$1 billion price tag and is scheduled for operation in 2017. Reportedly, the telescope will be the largest optical-infrared one in existence, consisting of a primary mirror measuring about 100 feet in diameter, three times the size of the current record-holding Keck Telescopes. Cal Tech physics professor Ed Stone stated, "We will be able to see back to the first light of the universe." Moore previously socked \$50 million into the cause. ▲

Tracking Objects Gets Much Easier With S5 Wireless Wide-Area Location Chips

GPS tracking takes sophisticated hardware, and it often doesn't work in urban canyons. But S5 Wireless, a Salt Lake City chip startup, believes it can dramatically lower the cost of tracking with "wide-area location" chips. These chips cost less than a dollar to make and can be placed on any object, said CEO David Carter. The chips use tiny 900MHz radios with a 50-mile range and consume just 250 milliwatts of power. Customers can set up radio base stations within a metropolitan region and then use triangulation techniques to fix the location of a particular chip as it sends signals to all the base stations. The chips are accurate within 9 meters and can get a fix within two seconds. They can also send encrypted data back at a rate of 700bps to a central location. However, the chips raise privacy concerns, as they make tracking simple and inexpensive. ▲



Samsung's GDDR4 Memory Chips Will Keep Up With Graphics Technology

It does no good to have a fast graphics chip if you can't feed data to it fast enough. That's why Samsung has launched its newest memory chip, the GDDR4 1.2GHz chip. The chip is designed to be compatible with AMD's new ATI Radeon HD 3870 GPU. The ATI Radeon HD 3800 Series GPUs transfer data at 72Gbps but consume less power than their predecessors. Samsung offers the 1.2GHz GDDR4 in a 16Mx32 configuration. It also has a 900MHz GDDR3 chip that also works with the ATI Radeon HD 3850 GPU.



D2 Audio Creates Intelligent Digital Amplifier Chip For Flat-Panel TVs

D2 Audio has introduced a low-cost digital audio amplifier chip that delivers home-theater sound for flat-panel TVs. The Intelligent Digital Amplifier chip is low-cost and enables speaker designers to create sleek and small speakers that also sound good. Such speakers often have challenging audio playback problems with TVs that have to be solved with DSP (digital signal processing) techniques. The D2 Audio DAE-3 DSP engine does all the audio processing for the speakers, enabling features such as psycho-acoustic effects that can be built into the TVs without adding new cost to the TV. That is necessary because flat-panel TVs are now being placed in secondary viewing locations where there isn't as much room for an independent home-theater system. ▲

Watching The Chips Fall

Here is pricing information for AMD and Intel CPUs.

*Retail price
** Manufacturer's price per 1,000 units
Other current prices, if indicated, are lowest OEM prices available through Pricegrabber.com

CPU	Released	Original price	Last month's price	Current price
AMD Turion TL-64 2.2GHz 1MB cache 1,600MHz HyperTransport bus	5/3/2007	\$354**	\$217	\$257
AMD Athlon 64 X2 Dual-Core 5600+ AM2 only	12/12/2006	\$505**	\$134	\$137
AMD Athlon 64 X2 Dual-Core 6000+ AM2 only	2/20/2007	\$464**	\$153	\$157
AMD Athlon 64 X2 Dual-Core 6400+ AM2 only	8/20/2007	\$251**	\$169	\$209
AMD Athlon 64 FX-70	11/30/2006	\$599/pair	\$336	\$364
AMD Athlon 64 FX-72	11/30/2006	\$799/pair	\$316	\$316
AMD Athlon 64 FX-74	11/30/2006	\$999/pair	\$299	\$274
AMD Phenom 9500	11/19/2007	\$251	N/A	N/A
AMD Phenom 9600	11/19/2007	\$283	N/A	N/A
Intel Core 2 Duo Mobile T7100 1.8GHz 4MB cache 800MHz FSB	5/9/2007	\$209**	\$197	\$214
Intel Core 2 Duo Mobile T7300 2GHz 4MB cache 800MHz FSB	5/9/2007	\$241**	\$209	\$251
Intel Core 2 Duo Mobile T7500 2.2GHz 4MB cache 800MHz FSB	5/9/2007	\$316**	\$233	\$252
Intel Core 2 Duo Mobile T7700 2.4GHz 4MB cache 800MHz FSB	5/9/2007	\$530**	\$322	\$322
Intel Core 2 Extreme Mobile X7800	7/16/2007	\$851**	\$851**	\$851**
Intel Core 2 Duo E6540	7/16/2007	\$163**	\$256	\$256
Intel Core 2 Duo E6550	7/16/2007	\$163**	\$165	\$169
Intel Core 2 Duo E6600 2.4GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	\$316**	\$183	\$204
Intel Core 2 Duo E6700 2.66GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	\$530**	\$312	\$309
Intel Core 2 Duo E6750	7/16/2007	\$183**	\$191	\$193
Intel Core 2 Duo E6850	7/16/2007	\$266**	\$271	\$271
Intel Core 2 Duo X6800 2.93GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	\$999**	\$994	\$994
Intel Core 2 Quad Q6600	1/8/2007	\$851**	\$274	\$269
Intel Core 2 Quad Q6700	7/16/2007	\$530**	\$529	\$534
Intel Core 2 Extreme QX6700	11/14/2006	\$999**	\$695	\$778
Intel Core 2 Extreme QX6800	7/16/2007	\$999**	\$944	\$944
Intel Core 2 Extreme QX6850 3GHz 8MB cache 1,333MHz FSB 65nm	7/16/2007	\$999**	\$944	\$944

Not On Our School's Computers, Jimmy Wales

We're getting the impression educators think today's students can't research their way out of a paper bag with Wikipedia around. As reported in the *New Jersey Express-Times*, Linda O'Connor, librarian at Great Meadows Middle School in Easton, Pa., was so concerned that students take Wikipedia as "gospel," she stuck "Just Say No To Wikipedia" signs on school computers. "They don't realize I could go on right now and write something about Great Meadows Middle School, and it could be totally bogus," she stated. For its part, Wikipedia doesn't recommend students use it as a primary research source, stated Sandra Ordonez, Wikimedia Foundation communications manager. "The best way to use Wikipedia is to get a global picture of a topic," she stated. ▲



Fastest Rising Search Term? "iPhone" With A Bullet

Because we know you're dying to know, "iPhone" topped the U.S. and global lists of the fastest-rising search terms in 2007 as entered at Google. Considering the iPhone was merely a source of rumors and anticipation in 2006, the results aren't too surprising. What is surprising is that "Webkinz" landed at No. 2 on the U.S. list. Evidently, there's an army of virtual pet lovers among us. Elsewhere, thanks largely to the outlaw-driving catastrophe that is Britney Spears, "TMZ" ranked third. Rest easy,

geeks, "Transformers" finished fourth, followed by "YouTube"; "Club Penguin," another children-based social networking site; "MySpace"; "Heroes"; "Facebook"; and, ugh, "Anna Nicole Smith." ▲

Jango Jingles The Social Networking Scene

One of the greatest all-time icebreakers is music. Unearth a shared passion for Slayer, and it doesn't matter if you and your tatted-up neighbor don't share anything else in common—you've got a head-banging buddy for life. That's the drift of Jango, our favorite new Web pastime. Simple as pie to use (just type an artist's name and you're streaming tunes), deliciously customizable (create and tweak your profile, rate songs, etc.), and packing tons of flavor to sample (tune in to other users' stations whenever you please), Jango is wafting with potential considering it's still in beta. In fact, Jango says in four months of private testing, 300,000 listeners created more than 600,000 shareable stations. Look for a miniplayer and embedded Jango Jukebox widget soon. ▲

Site Seeing

MIT Smartens Up High School Students

We know how intelligent *CPU* readers are. Thus, we assume you already know about MIT's OpenCourseWare project, which offers 1,800 syllabi, 15,000 lecture notes, 9,000 assignments, and 900 exams free online. What you intellectuals may not know is MIT has funneled OCW down to high schoolers via its new Highlights for High School effort that focuses on STEM (science, technology, engineering, and math) instruction. More than 2,600 video and audio clips, lecture notes, MIT course assignments, and animations are available. Interestingly, MIT guesses 10,000 U.S. high school teachers and 5,000 students already hit the OCW site per month. Unfortunately for budding eggheads, OCW doesn't grant MIT degrees or certificates. ▲

Arcade Fire Makes Music Videos Cool Again

Fantastically creepy. That's the best way we can describe Arcade Fire's interactive video for the pulsating track "Neon Bible" (beonlineb.com/click_around.html). The video keeps your browser's Back button plenty busy in an attempt to find hidden treasures you missed the first 20 times around. Arcade Fire was pinned with the "experimental" tag way early in its career, and "Neon Bible's" video is proof positive why. At just 2:16 (minutes:seconds) long, do yourself a favor and view for yourself why MTV is so yesterday. ▲



Need help customizing Audacity or other open-source projects? Head to SourceForge.net's newly opened Marketplace. "We're extending what is already the world's most open and transparent open-source hub to allow technology professionals to buy packaged support directly from the creators of the software," stated Mike Rudolph, SourceForge.net VP and GM. After months of beta testing, the eBay-like Marketplace went official in early December for techies looking to buy and sell. Listings numbered about 1,000 at press time. Postings are free, and buyers can contact sellers via email, as well as run background checks on sellers' experience, reputation, and other traits. PayPal, cash, checks, and credit cards are accepted, thank you. ▲



Using data garnered from Firefox's application update service, Mozilla COO John Lilly recently estimated the little browser that could has "at least 125 million Firefox users in the world right now, give or take." Meanwhile, Mozilla has released the first beta for Firefox 3 with added quickness and such UI enhancements as Places, a new bookmarking tool. Meanwhile meanwhile, Jeff Jones, Microsoft Trustworthy Computer Group's security strategy director, concluded in a recent study Mozilla has fixed more flaws in Firefox than MS in IE during equivalent time periods—199 vs. 87 since November 2004. Mozilla's Mike Shaver, director of Ecosystem Development, countered that Microsoft "bundles fixes, sometimes meaning that you get a single vulnerability 'counted' for, say, seven defects repaired," whereas Mozilla counts "every defect distinctly." ▲



Think your Internet service provider is “blocking, jamming, or degrading” your “ability to use particular applications, services, or protocols?” The EFF (Electronic Frontier Foundation) wants to help via Wireshark, software it released in late November to help verify or discount such suspicions. The EFF is also including documentation on how to use the packet-forgery tester. The release stems from EFF accusations that Comcast used packet-forgery techniques to purposely interfere with file sharers’ activities. The EFF says it ran separate tests in October with the Associated Press and others showing Comcast was forging packets “to interfere with its subscribers’ and other Internet users’ ability to use file-sharing applications, like BitTorrent and Gnutella.” The goods are available at www.eff.org/wp/developing-packet-injection. ▲



Software Shorts

Master Of Your "Seinfeld" Domain

Created by "Seinfeld" fans for "Seinfeld" fans comes "In Pursuit of Nothing" (www.inpursuitofnothing.com), a second-gen interactive DVD game pertaining to all things Jerry, George, Elaine, and Kosmo. We're tempted to pay the game's \$24.95 price just for the gameboard, which mimics the Monk Coffee Shop booth where the foursome explored nothingness for years. Gameplay boils down to each player pitching in \$2 to help cover George's lunch tab. Answer a trivia question correctly and your share goes down. The first player to reach nothingness wins. Now, put on a puffy shirt, open a box of Junior Mints, and yada yada yada. ▲



Past & Future Threats Abound

Sigh. If only all those smart little hackers out there could only use their power for good. According to security firm F-Secure, its database of malware signatures totaled about 500,000 at 2007's end, double what it started with at year's beginning. Wait, there's more bad news. F-Secure says it detects 10 to 40 new variants of online banking-related Trojans a day, and we can

look forward to the cyber thugs responsible for the Storm worm leasing access to other criminals in 2008. Meanwhile, Web-sense Security Labs' researchers predict loads of scams, attacks, and other malicious activities will stem from the 2008 Olympics. That's

the competitive spirit. ▲

Flickr Now Fixes Photos

Partnering with "lovely company" Picnik, Flickr now offers "world-class, Web-based" photo-editing tools to its millions of users. You must enable Picnik's tools first, but once you do, you'll like what you find. A new Edit Photo button opens up slider-based Auto-Fix, Rotate, Crop, Resize, Exposure, Colors, Sharpen, and Red-Eye tools, plus Advanced options that require a \$24.95 Premium account to use. You can also apply numerous effects, add text and shapes, touch up blemishes or whiten teeth, and add frames to shots. Before long, Flickr may snap your photos, too. ▲



BIOS Upgrades Available Online

Compiled by Steve Smith

Before you send another motherboard to the landfill, consider upgrading the BIOS and giving your PC a new lease on life. Here are a few recently released upgrades. Readers can check out www.cpumag.com/cpufeb08/bios to see our entire upgrade list.

Motherboard	Date Available	URL
Aopen EZ965 1.12	11/3/07	download.aopen.com.tw/Download.aspx?RecNo=11480&Product=XC%20Cube&Model=EZ965&Type=BIOS&DownSize=1158.5&fileURL=pub01%2fxcucube%2fez965%2fbios%2fwidc112.zip&Section=8&DL=yes
ASRock ALiveNF5SLI-1394 1.20	11/19/07	ftp://download.asrock.com/bios/AM2/ALiveNF5SLI-1394(1.20).zip
Asus Blitz Formula 1205	11/05/07	dlsvr03.asus.com/pub/ASUS/mb/socket775/Blitz_Formula/BF1205.zip
Asus Maximus Extreme 0702	11/19/07	dlsvr03.asus.com/pub/ASUS/mb/socket775/Maximus_Extreme/ME0702.zip
Biostar NF61S Micro AM2 1.0 524	8/7/07	www.biostar.com.tw/app/en-us/mb/bios.php?S_ID=25
ECS NForce6M-A 07/10/23	10/24/07	www.ecs.com.tw/ECSWebSite/Downloads/DownloadFile.aspx?catid=1&driverid=3886&areaid=2&LanID=9
Gigabyte GA-MA790FX-DS5 F2B	11/02/07	america.giga-byte.com/FileList/BIOS/motherboard_bios_ga-ma790fx-ds5_f2b.exe

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(12MB Cache, 1333MHz FSB)	
Extreme QX9650 3.00GHz	\$ 1935
(8MB Cache, 1066MHz FSB)	
Quad Q6700 2.66GHz	\$ 1429
Quad Q6600 2.40GHz	\$ 1145
(4MB Cache, 1333MHz FSB)	
E6850 3.00GHz	\$ 1145
E6750 2.66GHz	\$ 1055
E6550 2.40GHz	\$ 1029

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E6850 3.00GHz	\$ 1145
E6750 2.66GHz	\$ 1055
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E6750 2.66GHz	\$ 995
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 1000/100/10 Network, 56K V.92 Fax/Modem
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E6850 3.00Ghz \$ 1629
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Compiled by Steve Smith

The Job Search

Want to really get into World of Warcraft? No, we mean *really* get into it? The publishers of the wildly popular multiplayer online RPG, Blizzard Entertainment, want a Senior Programmer to work on the core technology that drives its games. This is for a real programmer's programmer, with seven or more years of experience in software engineering and five or more in C++. You will be mentoring associate-level programmers and need a big-picture view of artificial intelligence, "control theory," and user interface design principles.

The payoff for this expertise is being at the heart of the Blizzard franchises. Your work on the basic tool sets and code libraries will influence the Blizzard line, including past and future brands such as Starcraft, World of Warcraft, and Diablo. You can be a programming god at the Mount Olympus of role playing.

seeker.dice.com/job-search/servlet/JobSearch?op=302&dockey=xml/c/7/c703989afda9eb8d9d7ef21b4a761e21@endecain-dex&source=3

81%

Percentage of 4- to 17-year-olds who play electronic games.

38%

Percentage of adults who play electronic games.

5 MILLION

COPIES OF HALO 3 SOLD IN ITS FIRST WEEK.

500,000

Copies of Super Mario Galaxy sold in its first week.

1.7 million

Copies of Guitar Hero III sold in first three days of sale.

In Teenland, Tech Trails Threads

If you were on the receiving end of a young adult gift giver this past year, then you most likely got clothes, not an iPod or Xbox, according to Youth Trends' Holiday '07 Survey of holiday purchase intent among teens and college students.

Items U.S. Teens & College Students Plan To Purchase For Holiday Gifts

Apparel and Accessories	78%
Gift Cards	64%
Technology and Communication Devices	47%
Video Game Systems and Video Games	36%
DVDs	31%
Dorm/Residence Furnishing/Accessories	24%

Source: Youth Trends

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The Saint

by Alex St. John

12 Months Of Vista!

So, Microsoft finally made a consumer OS so bad that it boosted Apple's market share: Last year, Apple's shipments grew 37.2% over the previous year, more than double the growth of any PC OEM. Microsoft spent five years in development and how many billions of dollars to create a product so unpopular that consumers flock to avoid it. I overheard a conversation between two customer support reps from a major PC OEM saying that the No. 1 support call they get is consumers requesting a downgrade from Vista to Windows XP on their new PCs. The irony is that Apple users can still get WinXP and buy it to run their games, the only family of Windows applications that really *needs* a Windows OS to run anymore. As most gamers now know firsthand, Vista's great contribution to playing PC games is to suck up RAM for no productive purpose and slow them down about 12 to 15%, on average.

The Windows platform has become such a volatile environment for developers over the years that the ability to simply test an application across a variety of PCs and ship it in a box is a thing of the past. Now PC OEMs and retailers like Best Buy have come to realize that the only reliable way to sell Windows software and control support costs and returns is to test it and install and patch it themselves for the consumer. For anybody but the expert *CPU* reader, getting applications installed and running reliably on a PC can be a major undertaking.

Market analysts don't like to report overtly negative news about large publicly traded companies—especially Microsoft—but the subtext of a recent CNET article (www.news.com/Running-the-numbers-on-Vista/2100-1016_3-6207375.html?tag=nw.1) is clear. Vista is a market failure, and the only people buying it are the ones who are forced to get it with a new PC. Everyone with a "choice" is avoiding it or going with a Mac.

I love this quote from NPD analyst Chris Swenson: "The problem is that there are a lot of complex new features in Vista, and you need to educate consumers about them." This is code for, "Vista is fat and hard to use, and nobody understands why they need it."

Later in the article, Swenson points to further evidence that Vista is a bomb: "While much of the sales were for the new Office 2007, Swenson said just over 20% of all boxed copies of Office were Office for Mac. Swenson credited the large number of people switching to Macs as part of the reason for the spike in Mac Office sales."

This isn't to say that the Windows consumer software market isn't booming. According to NPD data, games are still the primary consumer applications people buy for their PCs, but the second largest category is—wait for it!—utilities and security software. You won't have an easy time finding this data on the Web because NPD sells it to software companies like mine, but it's likely that when you add in online subscriptions to security services, PC utilities becomes the No. 1 category. Am I the only one who thinks it's extraordinary that one of the largest, if not *the* largest, consumer markets for Windows applications is not productivity or entertainment applications but software and services you have to buy just to keep your broken Windows OS running?

Of course, every time I write a column expressing my disgust with the decline of Microsoft, I get a spate of emails suggesting that I switch to Ubuntu Linux. How this would do a better job of "enabling" me to play PC games and use Microsoft Office, the only applications I predominantly use my PC for, is still ambiguous to me. Personally, my advice to Microsoft would be to launch Windows XP/SP3 as Vista SP1.

Having finished this column, I will now spend the next five minutes hiking through Office 2007's arduous new UI to try to figure out how to create a new document. . . . Ah, here it is, you have to click the down arrow next to the Undo button in the top navigation bar to create a "New" icon in the bar because apparently using Microsoft Word to create NEW documents is an extremely rare event. Oh wait, you can also do it by clicking this icon in the upper-left corner that looks, appropriately, like a tangled knot of Christmas ribbon. ▲

Send your feedback to
thesaint@cpumag.com



Alex St. John was one of the founding creators of Microsoft's DirectX technology. He is the subject of the book "Renegades of the Empire" about the creation of DirectX and Chromeffects, an early effort by Microsoft to create a multimedia browser. Today Alex is president and CEO of WildTangent, Inc., a technology company devoted to delivering CD-ROM-quality entertainment content over the Web.

DREAM HARDWARE

These Gizmos Don't Sing It, They Bring It



You're seeing wider than wide. You're hearing deeper than deep. And you won't believe what's coming out from under your bed. Sweet dreams.

by Marty Sems

Immersive Media Dodeca 2360

Geeks of a certain stripe will remember that the 12-sided die in every Dungeons & Dragons set went practically unused. If the DM instructed anyone to "roll a d12," it was probably because the d10 or d20 was lost under the couch. Still, 12 is the magic number for a 360-degree video camera. IMC's Dodeca (for dodecahedron) 2360 captures 2,400 x 1,200, 30fps video from almost every direction at once (www.immersivemedia.com). It uses 11 cameras; the twelfth face of the unit is for the mount. This is the camera that captures Google Maps Street View images from the tops of vehicles and it can coordinate with GPS. It's available for rental as part of a package that includes a hard drive-based recording unit and the necessary panoramic post-production to stitch all those overlapping images together into omnidirectional video. IMC says that pricing for an episodic series runs about \$3,000 per minute.

ADAM Audio Sub2100

"The frequency response goes below what is actually humanly possible to hear," says ADAM Audio spokesman Brian McConnon. "The result is sound that is felt and not heard." The Sub2100 (\$6,000; www.adam-audio.com) can't hide the reason behind its abyssal thunder: It holds the world's largest voice-coil subwoofer, ADAM says, a 21-inch, paper cone beast that requires a special motor to keep it corralled. The highly efficient (99dB/W/m) sub weighs 187 pounds and packs a thousand-watt (RMS) amplifier. Yet despite its size, it's no mud box. Its linear SPL peaks at 128dB or more, even down low. The next time your brother describes the chest-buzzing novelty woofer at the last concert he attended, blow him through the wall with your Sub2100.

MK1 Studio Underbed Lift

Keep your jokes to yourself, please. Here's the scenario: You want in-your-face, big-screen movies and sports in the comfort of your own bed. Your significant other indicates that a big, black rectangle would look out of place amongst the floral motif and quilts of the bedroom, and this time, she'll take the kids and dog with her. Salvage the relationship with an Underbed Lift (www.underbedlift.com) from U.S. distributor K2 Mounts (www.k2mounts.com). Push a button and the Lift trundles out your 50-inch plasma or LCD from under the bed and raises it in half a minute. Fully outfitted with 7.1 sound, with the major components stowed neatly under the bed, a king-sized Lift will run you about \$20,000. The queen-sized model will handle a 42-inch flat panel. And yes, we already thought of that smart remark. That one, too. ▲



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3D Viewing Angle : 90 [L/R] / 10~12 [U/D]
Response Time : 5ms



ZM-M190

Screen Size : 22" wide
Pixel Pitch : 0.282[H] x 0.282[W] mm
Luminance of White : 300cd/m²
Contrast Ratio : 1000 : 1
2D Viewing Angle : 160 [L/R] / 160 [U/D]
3D Viewing Angle : 90 [L/R] / 10~12 [U/D]
Response Time : 5ms

3D
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Say Hello To G92

8800 GTs Make DX10 Even More Accessible

The stellar G80 has been out for more than a year now, and it's been quite a year for Nvidia. AMD hasn't been able to surpass—let alone approach—the high-end G80's performance with its high-end Radeon HD 2900 XT. And to add insult to injury, AMD has had to sell its Radeon HD 2000 Series cards dirt cheap just to remain competitive. But resting on its laurels just isn't in Big Green's playbook. Nvidia's answer to AMD's price war is the G92, a reconditioned G80 that draws less power and offers several new enhancements. The first G92-based graphics card is the GeForce 8800 GT, which Nvidia has priced in the wallet-friendly \$199 to \$259 range.

Nvidia equipped the 8800 GT with a 600MHz core clock, 900MHz memory clock, and 1,500MHz shader clock. Compared to the 8800 GTX and Ultra, the 8800 GT comes with 16 fewer stream processors (112) and a narrower 256-bit memory bus. The initial revision of the 8800 GTS had just 96 stream processors to work with, but Nvidia revitalized its GTS suffix by enabling all 128 stream processors on the G92-based 8800 GTS, effectively placing the new 8800 GTS above the 8800 GT in terms of performance. The stock 8800 GT, as well as the overclocked versions we benchmarked, include 512MB of GDDR3 memory. At press time, 256MB 8800 GTs had hit the market; expect to see 1GB variants available by the time you read this.

The most striking thing you'll notice about the 8800 GT is that it's a single-slot graphics card with a black aluminum fansink and a single 6-pin PCI-E power connector. For this card, Nvidia was able



NX8800GT-T2D512E OC

\$239

MSI

www.msicomputer.com



Specs: GPU: GeForce 8800 GT; Core clock: 660MHz; Memory: 512MB DDR3 (950MHz)

to stick to a power consumption of 110 watts, largely thanks to a slimmer 65nm die. The GeForce 8800 Ultra, GTX, and GTS all feature 681 million transistors and a 90nm die. With the GeForce 8800 GT, the transistor count has been bumped up to 754 million. Other components of the 8800 GT include HDCP-compliant hardware and the requisite keys, two dual-link DVI-I ports, and a TV-out port.

One of the new features of Nvidia's G92 is support for the PCI-E 2.0 specification, which offers twice the interface bandwidth of the previous PCI-E, delivering 16GBps to each 16-lane link. Although most chipsets on the market don't yet support PCI-E 2.0, the spec is fully backward-compatible with version 1.1 and 1.0. PCI-E 2.0 is also capable of supplying cards with double the power, up to 150 watts.

Another advantage the G92 has over its older sibling is Nvidia's second-gen PureVideo HD engine, VP2 (Video Processor

2), which can offload much of the CPU-intensive HD video decoding to the GPU. Previously only available in GeForce 8500 and 8600 series GPUs, the VP2 delivers hardware support for MPEG-2, VC-1, and H.264 decoding functions, such as bitstream processing, inverse transform, motion compensation, and deblocking. By comparison, the rest of the 8800 Ultra, GTX, and GTS graphics cards only support VP1, the same processing engine found in Nvidia's aging 7 series graphics cards.

Despite the architectural revisions found in G92, Nvidia left DirectX 10.1 off the drawing board. The 8800 GT offers full DX10 support, but when Vista's SP1 ships later this year, the card won't support the revised spec, which is slated to include support for Shader Model 4.1, improved antialiasing, and jazzed-up HDR effects. We've yet to see if these tweaks to the DX10 API will translate into any real-world eye candy, so stay tuned.



MSI NX8800GT-T2D512E OC

As of this writing, MSI's only G92-based offering was a factory-overclocked GeForce 8800 GT, the NX8800GT-T2D512E OC. At least outwardly, this first batch of 8800 GTs won't stray too much from Nvidia's reference design, and the MSI is no exception. The NX8800GT-T2D512E OC features two dual-link DVI ports and a 9-pin TV-out for the included component and S-Video dongle. Other accessories include a single DVI-to-VGA adapter and a PCI-E power cable. The fansink shroud is the stock single-slot black aluminum with a cliché gaming femme's face plastered across it.

MSI shipped the card with a 660MHz core clock and a 950MHz memory clock, which represents a fairly conservative overclock compared to some of the other cards in this roundup. Unsurprisingly, MSI's horse beat the stock-clocked PNY by a nose in most tests. The one surprising result was the 5.2fps score in Company of Heroes (2,560 x 1,600), which inexplicably trailed the rest of the cards in this roundup by about 10fps. Then again, it is an overclocked 8800 GT priced below the stock-clocked PNY 8800 GT.

MSI's 8800 GT is an absolute bargain among a series of graphics cards that are already fairly inexpensive.

XFX 8800 GT XXX Alpha Dog Edition

XFX sent us the XXX version of its 512MB 8800 GT, which features a

670MHz core clock and a 975MHz memory clock. Again, the sample from XFX features the aluminum-sheathed fansink, only this one's adorned with XFX's signature drooling canine. The back plane features the standard two dual-link DVI ports and the TV-out

8800 GT XXX Alpha Dog Edition

\$299.99

XFX

www.xfxforce.com



Specs: GPU: GeForce 8800 GT; Core clock: 670MHz; Memory: 512MB DDR3 (975MHz)



e-GeForce 8800GT KO

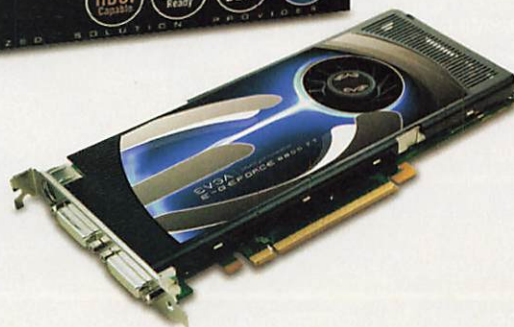
\$289.99

Evga

www.evga.com



Specs: GPU: GeForce 8800 GT; Core clock: 675MHz; Memory: 512MB DDR3 (975MHz)



port. Despite being the most expensive card we tested (even compared to the higher-clocked Evga and Asus cards), XFX sweetens the deal with the full version of Company of Heroes, separate component and S-Video cables, two DVI-to-VGA adapters, and a PCI-E power cable.

In the tests, the XFX 8800 GT XXX consistently outscored the lower-clocked variants. It also managed to slightly outpace the Evga card in Company of Heroes at 2,560 x 1,600 and 1,280 x 1,024. This card also managed to post 4fps in

World in Conflict at 2,560 x 1,600. XFX's overclocking experience was evident.

The XFX 8800 GT is a bit on the pricey side, but it's no slouch in the performance category. Only consider this card if you haven't already picked up Company of Heroes.

Evga e-GeForce 8800 GT KO

Evga offers a range of 8800 GTs from the stock variant up to the e-GeForce 8800 GT SSC 512MB, which has an impressive 700MHz core clock and 1,000MHz memory clock. The model

we tested, the e-GeForce 8800 GT KO, has a 675MHz core clock and a 975MHz memory clock. Evga also gives you a full version of Enemy Territory: Quake Wars. The e-GeForce 8800 GT KO is identical to the other cards we tested, save the fansink decal, which displays the Evga logo against a subtle blue and black background. Other accessories include a component cable, an S-Video cable, a pair of DVI-to-VGA adapters, and a PCI-E power cable.

In the synthetic benchmarks, Evga's unit couldn't quite best the EN8800 GT

By The Numbers

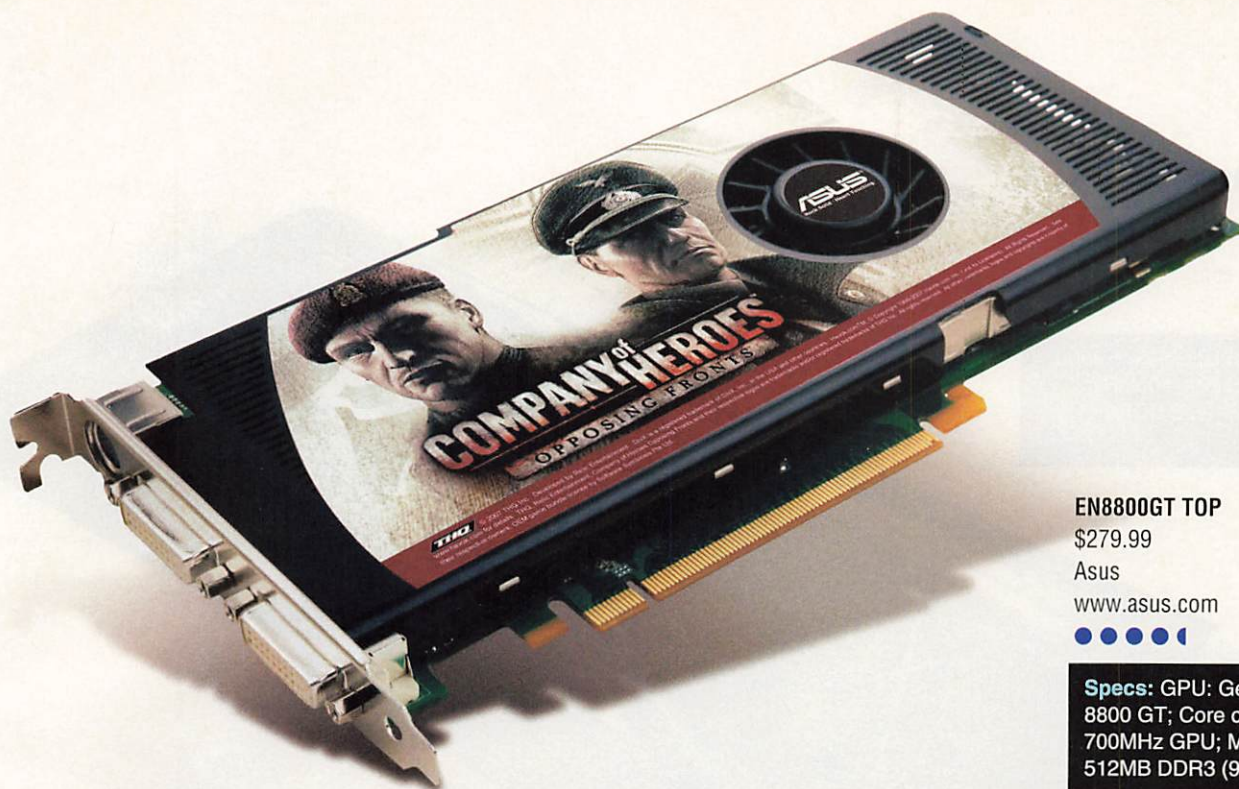
Our test system consisted of the P35-based Asus P5B Deluxe, 2.93GHz Intel Core 2 Extreme X6800, 150GB 10,000rpm Western Digital Raptor loaded with Windows Vista 32-bit, and 2GB of Corsair Dominator 1,066MHz DDR2 memory. For testing the GeForce 8800 GT and 8800 Ultra, we used the beta ForceWare driver version 169.12, which was freely available to the public

as we went to press. World in Conflict relies heavily on the CPU, so we enabled both antialiasing and anisotropic effects to make sure we were stressing the graphics hardware. We also tested the graphics cards with Crysis and the DX10-patched version of Company of Heroes. S.T.A.L.K.E.R. stepped up to illustrate the 8800 GT's DX9 performance. ▲

	MSI NX8800GT-T2D512E OC	XFX 8800 GT XXX Alpha Dog Edition	Evga e-GeForce 8800 GT KO
Memory	512MB GDDR3	512MB GDDR3	512MB GDDR3
Core Clock	660MHz	670MHz	675MHz
Memory Clock	950MHz	975MHz	975MHz
3DMark06	11375	11547	11574
3DMark06 HDR/SM3.0	5301	5391	5401
Company of Heroes (4XAA)*	47.7	47.7	39.3
S.T.A.L.K.E.R.	79.84	81.63	81.37
Crysis*	19.03	18.96	18.92
World in Conflict (2XAA, 8XAF)*	25	24	25
3DMark06	10226	10348	10378
3DMark06 HDR/SM3.0	4290	4389	4399
Company of Heroes (4XAA)*	27.9	31	34.2
S.T.A.L.K.E.R.	62.74	63	63.04
Crysis*	12.37	12.41	13.47
World in Conflict (2XAA, 8XAF)*	21	19	20
3DMark06	7280	7396	7411
3DMark06 HDR/SM3.0	2606	2667	2671
Company of Heroes (4XAA)*	5.2	15.9	12.7
S.T.A.L.K.E.R.	33.29	33.89	34.11
Crysis*	3.09	3.02	3.04
World in Conflict (2XAA, 8XAF)*	3	4	2
Price	\$239.00	\$299.99	\$289.99
CPU's	●●●●	●●●●	●●●●
*DirectX 10			

Stock specs: GPU: GeForce 8800 GT; Core clock: 600MHz; 512MB DDR3 (900MHz); 112 stream processors

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●● 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT



EN8800GT TOP

\$279.99

Asus

www.asus.com

●●●●●

Specs: GPU: GeForce 8800 GT; Core clock: 700MHz GPU; Memory: 512MB DDR3 (900MHz)

Asus EN8800GT	PNY 8800 GT 512MB PCIe 2.0	Nvidia GeForce 8800 Ultra
---------------	----------------------------	---------------------------

512MB GDDR3	512MB GDDR3	768MB GDDR3
700MHz	600MHz	612MHz
1,000MHz	900MHz	1,080MHz

11755	10999	11838
5552	4957	5787
46.2	44.9	55.1
81.94	77.87	100.8
19.23	17.29	21.81
23	23	33

10581	9648	10698
4527	4015	4890
33.8	26.8	41.6
57.69	59.96	78.15
13.45	12.42	16.07
21	18	29

7607	6840	7878
2757	2436	3106
10.7	14.7	22.1
37.85	33.3	44.92
3.05	3.11	6.02
3	3	19

\$279.99	\$269.99	\$699
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(which has higher clocks), but it did perform well against the other 8800 GTs, consistently scoring the second-highest in 3DMark06 across all resolutions. The results in the real-world benchmarks were a little more mixed. Evga's card only managed 2fps in World in Conflict at the highest resolution but scraped by with the highest Crysis score at 1,600 x 1,200.

We would have preferred to see a bundled DX10 game, but this card still scores high in the ever-important value category.

Asus EN8800GT TOP

Asus currently offers a stock-clocked EN8800GT as well as the overclocked EN8800GT TOP. We received the aptly named TOP model, which features an impressive 700MHz core clock and 1GHz memory clock. Despite the aggressive clocks, Asus chose to equip this unit with the standard fansink. Both models are adorned with a Company of Heroes decal and looked so similar that we had to install Nvidia's nTune utility to make sure we indeed had the overclocked version. As you might have inferred based on the decal, Asus gives you a copy of Company of Heroes:

8800 GT 512MB PCIe 2.0

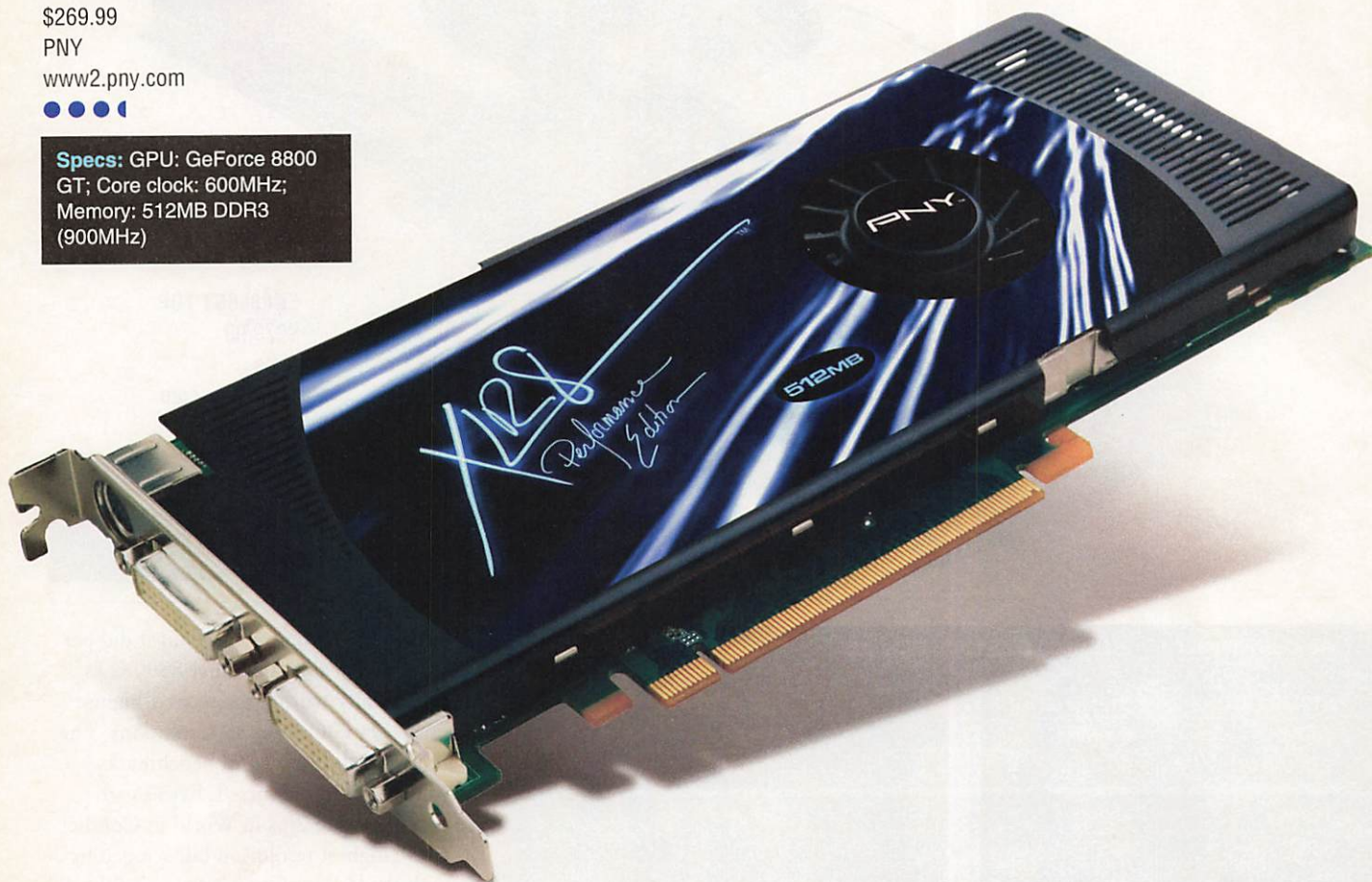
\$269.99

PNY

www2.pny.com



Specs: GPU: GeForce 8800 GT; Core clock: 600MHz; Memory: 512MB DDR3 (900MHz)



Opposing Fronts in addition to a DVI-to-VGA adapter, component cable, PCI-E power cable, and vinyl CD case.

Once we started running benchmarks, it immediately became apparent that this card had something special under the fansink. The EN8800GT TOP took the crown in 3DMark06 at all resolutions and consistently came within about 100 points of the 8800 Ultra's 3DMark06 scores. It also achieved the highest S.T.A.L.K.E.R. score at 2,560 x 1,600.

For that suggested retail price, Asus has a real winner on its hands. (Due to limited availability and high consumer demand as we went to press, street prices for all 8800 GTs were considerably higher than the MSRP.)

PNY 8800 GT 512MB PCIe 2.0

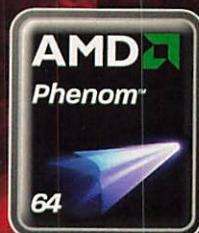
Of those we tested, PNY sent us the only 8800 GT that wasn't overclocked. The G92 launch marks a bit of a departure compared to the G80 launch. If you'll recall, during the G80 launch, Nvidia told its partners not to overclock the 8800 GTX and GTS and just release the factory-clocked cards. PNY's 8800 GT, like the reference design, has a core clock of 600MHz and a memory clock of 900MHz. The card is adorned with the XLR8 Performance Edition logo. Accessories include a component, composite, and S-Video dongle; PCI-E power connector; and two DVI-to-VGA adapters. As we went to press, PNY only offered the stock-clocked variant, so we expected a matching performance.

In the synthetic benchmark, PNY's 8800 GT scored between roughly 375 and 750 points lower than the over-clocked models. The 8800 GT managed to score an average of about 1,000 points behind the 8800 Ultra, which is fairly impressive considering the price gap between the two cards. In Crysis at 2,560 x 1,600, the PNY card actually managed to get the top score, albeit by less than 1fps.

Compared to the other cards, the PNY 8800 GT 512MB PCIe 2.0 is a bit expensive for a stock card and not much extra, but we really can't complain about paying less than \$300 for such a quality DX10-capable graphics card. ▲

by Andrew Leibman

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CyberPOWER Inc.

War Machine M1 Elite

War Machine's M1 Elite is one intimidating desktop PC. The hulking system has a simple but appropriately sinister skulls-and-gears theme that ought to unnerve your neighbors when you show up to the next LAN party. More importantly, it has the performance to back up its 'tude.

The case itself is a Cooler Master Stacker 832 that features laser-cut gear images and silkscreen skulls. War Machine tells me that it has Cooler Master anodize the interior of the case so that it's black inside and out. I like that touch, particularly because War Machine puts extra effort into creating the sort of system interior you don't mind showing to curious LAN-goers. The cables have mesh or loom sheathing, and cable ties keep extra cable length out of sight.

War Machine does itself and its customers a big favor by securing both of the Evga GeForce 8800 Ultra Superclocked graphics cards with Cardkeeper CK99-1224s. The Cardkeepers keep those heavy cards safe during transit to you and protect them when you put the M1 Elite in the backseat and head for a LAN party.

My M1 Elite had an Intel Core 2 Extreme QX6850 that sits under an Asetek OEM liquid cooler. (The radiator and its 120mm fan sit at the back of the system, exhausting warm air.) War Machine over-clocked my system to 3.66GHz but says it will likely offer the PC to users at 3.5GHz as it's getting better performance at that speed. Even so, my system was stable and ready to play: It hit 18203 in 3DMark06, completed Cinebench 10's multi-GPU test in a speedy 1:08 (minutes:seconds), and handled my game benchmarks well.

These days, most luxury systems (including top-shelf gaming rigs) are nearly silent. Not so with the M1 Elite. You'll notice the system's fans as soon as you power the PC on and, although it isn't



M1 Elite
\$5,032 (as tested)
War Machine
www.projectwarmachine.com
●●●●

loud enough to drown out your game, it's a little distracting. An easy-to-reach fan controller would go a long way towards solving the noise issue, as it would let you tone the noise down a bit when you're not running the M1 Elite at full throttle.

I also have a beef with the accessories War Machine chose not to include. The attention to detail that made for such a great interior wasn't applied to the system's binder, which is accompanied by a T-shirt and a mousepad. Most boutique builders pack their systems with a binder that features Windows and driver discs, tech support phone numbers, troubleshooting hints, and warranty information. Biohazard PC, for example, has particularly info-packed binders that often answer some of my questions before I contact the builder.

The M1 Elite's binder offers only the driver and Windows discs, Evga's mobo manual, a few stickers, and dog tags. If you

need tech support, you won't find the number—(888) 927-2927—in the binder.

With the M1 Elite, War Machine delivers a gamer that covers some important bases. It delivers real graphics power; it's physically tough enough to withstand regular LAN party trips; and it has a smart aesthetic theme. That said, the M1 isn't quite as polished as a luxury gamer should be, thanks to the computer's noisiness and its lackluster binder. War Machine seems to have the technical know-how and the creativity to put together a solid PC. Now it needs to work on the details that separate the gamers from the gAm3rz. ▲

by Joshua Gulick

Benchmark Numbers

3DMark06	
Overall	18203
SM2.0	7532
HDR/SM3.0	8327
CPU	4976

PCMark05	
Overall	10392
CPU	11685
Memory	4895
Graphics	13190
HDD	8765

Dr. DivX*	2:52
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WinRAR*	
3.7 Beta	2:29
3.71	2:27

Cinebench 10*	
Single-threaded	3:55
Multithreaded	1:08

POV-Ray 3.7 Beta**	3189
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Crysis (4XAA)	6fps
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Company of Heroes (4XAA)	37fps
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World in Conflict (4XAA, 16XAF)	27fps
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S.T.A.L.K.E.R.	74fps
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* minutes:seconds

** pixels per second

*** Games tested at 2,560 x 1,600

Specs: CPU: Intel Core 2 Extreme QX6850 @ 3.66GHz; Motherboard: Evga 122-CK-NF68-A1; RAM: 2GB G.Skill PC2-6400; HDD: 150GB Western Digital Raptor X (2x; RAID 0), 750GB Seagate ST3750640AS; Graphics: 768MB Evga GeForce 8800 Ultra Superclocked (SLI); Integrated Gigabit; Keyboard/Mouse: Logitech G15/G9; Vista Ultimate 32-bit

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●● 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Gigabyte iSolo 210

For enthusiasts, buying a case is like buying a home. You have to ask yourself, "Is this where I see my PC in five years?" Can the case accommodate that massive heatsink you plan to buy in six months? And if the heatsink isn't cutting it, can you install a watercooling system without making modifications? What about adding hard drives, expansion cards, and peripherals? Are there enough vents and fans to keep up with it all? If you're eyeballing the Gigabyte iSolo 210, then the answer is a hearty "Yes" on all accounts.

The iSolo 210 is constructed of thick steel wrapped in a coat of paint in your choice of silver, black, or metallic gray. Despite the midtower size, the interior of

the iSolo 210 felt downright roomy. There are five 3.5-inch bays, five 5.25-inch drive bays, and seven expansion slots, which should be more than sufficient for most uses. Gigabyte covered my cooling needs with two 120mm fans (for intake in the front and exhaust in the rear), a mesh side panel, and a mesh front bezel. You can also add Gigabyte's 3D Galaxy watercooling system (and most other externally-mounted systems) with the two grommets holes in the back of the case. The iSolo's tool-less features also made installing drives and expansion cards a cinch.



Gigabyte's iSolo Flash site bills the case as ideal for the living room, but the tower configuration, lack of a built-in VFD or LCD, and garish blue LED make an odd choice for an HTPC. But if you're looking for a solid

case with plenty of enthusiast-friendly features, the iSolo won't disappoint you. ▲

by Andrew Leibman

iSolo 210

\$99.99

Gigabyte

www.gigabyte.com



Specs: Bays: 5.25-inch (5), External 3.5-inch (2), Internal 3.5-inch (3); Form factors: ATX, mATX; Fans: 120mm (2); Front ports: FireWire, audio, 2 USB

Addonics Quad-CF PCI Controller

Is CompactFlash RAID the poor man's SSD? With a new 4-slot PCI 2.2 card from Addonics, you can build your own solid-state disk out of spare memory cards.

Addonics' AD4CFPRJ supports up to four Type I CF cards; two slots accept Type II cards and Microdrives. The venerable Silicon Image 0680 controller supports RAID 0, 1, and 10. The ASIC uses ECC and can map out bad sectors on the fly, but it doesn't feature the wear-leveling algorithms most recent SSDs use to extend their lives. Addonics recommends using industrial-type CF cards with long life spans (> 1 million read/write cycles).

This controller supposedly can only RAID CF cards of the "fixed disk" type, not the more common "removable" type. However, we were able to get around this rule with two cards graciously sent to us by SanDisk (www.sandisk.com); your mileage may vary. The included SiICfg utility declared the professional-grade Extreme Ducati Edition 4GB cards (\$164.99) to be removable, but the

AD4CFPRJ's onboard RAID utility (press F3 after POST) let us make a RAID 0 anyway. (Addonics says that it's investigating an issue making a 4-card RAID 0 slower than a 2-card array.)

Addonics says that the AD4CFPRJ's bootability also requires fixed-disk cards, but we convinced WinXP Pro to launch from an Extreme Ducati. However, the OS installation took several tries, and WinXP Setup wouldn't recognize our removable-disk RAID.

The controller comes with a drive activity LED and header, plus an optional low-profile bracket. It supports Windows 98/Me/NT4/2000/XP/Vista, DOS, and Linux 2.4 and later.

Obviously, the CF cards you use will determine the resulting performance, capacity, and cost. Run-of-the-mill cards will be uninspiring performers, even in a RAID, and small capacities won't be worth messing with.

And you're not going to surpass a 3.5-inch hard drive's sequential performance.

On the other hand, if you spend wisely on reasonably big and fast cards in fixed-disk mode, your multiplayer game server could realize SSD-like IOPS without the high price. ▲

(NOTE: Subscribers can go to www.cpubmag.com/cpubfeb08/addonics for performance data.)

by Marty Sems



Quad-CF PCI Controller

\$49.99

Addonics

www.addonics.com



Specs: PCI 2.2 (32-bit/33MHz); RoHS; 1-year warranty

Corsair TX750W & TX650W

A PSU Double Feature

When Corsair first entered the power supply market with its 620-watt HX620W unit in mid-2006, the company eschewed excessively high power output in favor of a modular design and overall value. This move was somewhat out of character for a company known for its over-the-top memory kits, especially given the growing number of 900W to 1kW units that were hitting store shelves at around the same time. Nevertheless, the HX620W was plenty powerful for most users and was generally praised for its high quality. Corsair followed up with the introduction of the VX series of power supplies, which were designed for users who favored high efficiency and low noise over high output. The VX series of power supplies were also successful and garnered their fair share of praise, despite relatively conservative maximum output ratings.

Corsair has since expanded its line of power supplies again to include the new TX series. Unlike the HX and VX series that came before it, however, the TX series is all about power-hungry enthusiasts who demand a lot of juice on their PSUs' +12V rails. The first two products in the TX series are the TX750W and TX650W. As their names suggest, these PSUs carry 750-watt and 650-watt maximum output ratings, respectively.

Although the TX750W and TX650W differ in their peak output ratings, they have many features in common. Both of the power supplies offer 80%+ efficiency ratings, which is common in the high-end PSU arena. But where most manufacturers simply claim an 80%+ efficiency rating



TX650W
\$159



TX750W

\$179

Corsair

www.corsairmicro.com



and don't detail the specifics of their testing, Corsair says that the TX series can maintain their high efficiency under 20 to 100% load conditions. Corsair's TX series of power supplies also has a single, high-output +12V rail. The TX750W can output up to 60A on its +12V rail, while the TX650W can manage 52A. Both power supplies offer overcurrent and overvoltage protection, in addition to undervoltage and short circuit protection. And both are built using high-quality, Japanese-made capacitors and feature Active PFC.

Bucking the current trend in high-end power supplies, the TX series of PSUs don't have modular cables. That's right, the whole mess of cables, which include multiple 6+2-pin PCI-E power leads for dual-GPU configurations, are hardwired. But every cable is sheathed in black mesh to keep things as tidy as possible for a nonmodular PSU. Corsair also throws in some wire ties to aid users in their cable management endeavors.

The TX750W and TX650W differ (in addition to the peak +12V output mentioned earlier) in regard to their cooling fans. The TX750W has a huge 14cm, dynamically controlled cooling fan; the TX650W's is 12cm. Both cooling fans are extremely quiet under normal operating conditions, however. Neither generates more than about 20dBA of noise until power consumption reaches approximately 375W. And neither generated more than 38 to 43dBA under a 100% load.

We tested the TX750W and TX650W on a system that is outfitted with a pair of Radeon HD 2900 XT cards, an Intel Core 2 Extreme QX6850, 4GB of RAM, and a pair of 150GB Raptor hard drives and can consistently consume about 550 watts from an AC outlet under full load. After hours of use, the voltage output on the TX750W's and TX650W's 3.3V, 5V, and 12V rails remained consistent. Both remained quiet throughout the testing process.

Corsair may not be offering power supplies with the highest output, but the company has obviously focused on quality since entering the fray. The new TX series of power supplies further proves that point. These are great power supplies. ▲

by Marco Chiappetta

Specs (TX750W): 14cm cooling fan; Output: 24A (+3.3V), 28A (+5V), 60A (+12V), .8A (-12V), 3A (+5VSB); Max Wattage: 750W; Cables and connectors: ATX 20/24-Pin, EPS/ATX12V 8/4-pin, PCIe 6+2-pin (4), SATA (8), 4-pin peripheral (8), Floppy (2); Active PFC; five-year warranty

Specs (TX650W): 12cm cooling fan; Output: 24A (+3.3V), 30A (+5V), 52A (+12V), .8A (-12V), 3A (+5VSB); Max Wattage: 650W; Cables and connectors: ATX 20/24-Pin, EPS/ATX12V 8/4-pin, PCIe 6+2-pin (4), SATA (8), 4-pin peripheral (8), Floppy (2); Active PFC; five-year warranty



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or visit www.nor-tech.com.

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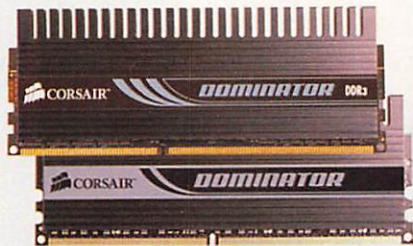
Corsair Dominator TWIN3X2048-1800C7DFIN G

We've looked at a number of Corsair's Dominator memory kits in the past, so we'll spare you the details regarding the TWIN3X2048-1800C7DFIN G kit's DHX (Dual-path Heat Xchange) cooling system. Like previous versions, the memory features multiple extruded aluminum heatsinks to maximize heat dissipation from the chips and PCB.

And if you're familiar with Corsair's Dominator memory kits, then you know it's not the TWIN3X-2048-1800C7-DFIN G's cooling

system that will impress, but its features, specifications, and sizzling performance.

The TWIN3X2048-1800C7DFIN G is a 2GB, dual-channel, DDR3 memory kit. Rated for operation at 1,800MHz



with latencies of 7-7-7-20 and a 2.0V feed, this new kit's primary specs are identical to the TWIN3X2048-1800C7DF we looked at in a recent roundup. (See page 70 in the January 2008 issue.) The "IN" in the 1800C7DFIN G's name isn't the kit's main differentiator, though; it's support for Intel's XMP (Extreme Memory Profiles). Like EPP (Enhanced Performance Profiles), XMP uses data stored in the modules' SPD (serial presence detect) to tell compatible motherboards how to properly config-

ure the memory for maximum performance. But thankfully, you don't need an XMP-compatible motherboard to wring some eye-popping performance from this kit.

When running at its rated frequency on an Asus X38 motherboard, the TWIN3X2048-1800C7DFIN G kit offered up an impressive 8.2GBps of memory bandwidth in SiSoft SANDRA XII. And when we pushed it to 1.99GHz, that number jumped to 9.4GBps. Top-notch performance is certainly one of this kit's attributes.

DDR3 memory continues to be expensive in comparison to DDR2, but the number of high-performing DDR3 products hitting the market is sure to drive prices down in the not too distant future. Regardless of price, the Corsair TWIN3X-2048-1800C7DFIN G kit is a killer product worthy of your PC's DIMM slots. ▲

by Marco Chiappetta

Dominator TWIN3X2048-1800C7DFIN G
\$559

Corsair
www.corsair.com
● ● ● ● ●

Specs: Capacity: 2,048MB (2x 1,024MB); Latencies: 7-7-7-20; Voltage: 2.0V; lifetime warranty

ABS Tagan BZ800

It's not often that an unassuming power supply has numerous standout features. ABS' Tagan BZ Series 800W unit, however, differentiates itself from the recent bevy of high-end power supplies in quite a few ways. Right out of the box, you know this isn't your run-of-the-mill PSU. Unlike most power supplies, the Tagan BZ800 has an accessory bundle consisting of a Phillips screwdriver, an antivibration rubber mounting gasket, a pair of insulated gloves, and more, all in a heavy-duty, zippered pouch.



All of the modular cables are sheathed in mesh for protection (and good looks), and the PCI-E cables are constructed of REMI cord, which can reduce ripple and EMI through the use of ferrite core chokes permanently attached at each end. While we're on the subject of its modular cables, each of the BZ800's cables features a keyed connector that prevents damage to the PSU from trying to jam cables in the wrong way. And the screw-on connectors can't be accidentally removed or jarred loose. Lighted receptacles further differentiate this power

supply from the pack. ABS dubbed the BZ800's cable management system "PipeRock"; let's hope that wasn't being smoked when ABS thought up the name.

To stress-test the BZ800, we used it to power a rig equipped with a pair of Radeon HD 2900 XTs, a Core 2 Extreme E6850, 4GB of RAM, and a pair of Raptor hard drives. In this configuration, our test rig pulled over 550W at the outlet under load. Over the course of a week of heavy testing, the BZ800 never faltered, remaining cool and quiet. Voltage output on its 3.3V, 5V, and 12V rails remained constant. This is clearly a PSU to consider for your next build. ▲

by Marco Chiappetta

Tagan BZ800
\$219.99
ABS
www.abs.com
● ● ● ● ●

Specs: 6 12V rails; Cables: 24-pin main, 4-pin 12V, 4+4-pin 12V, 6-pin PCI-E (2), 8-pin (6+2) PCI-E (2), SATA (2; four devices per cable); 4-pin Molex (2; four devices per cable including 1 floppy), 4-pin Molex (one device), 13.5cm fan; Output: 26A (+3.3V), 26A (+5V), 64A (+12V), .8A (-12V), 3A (+5VSB); Active PFC; lifetime warranty

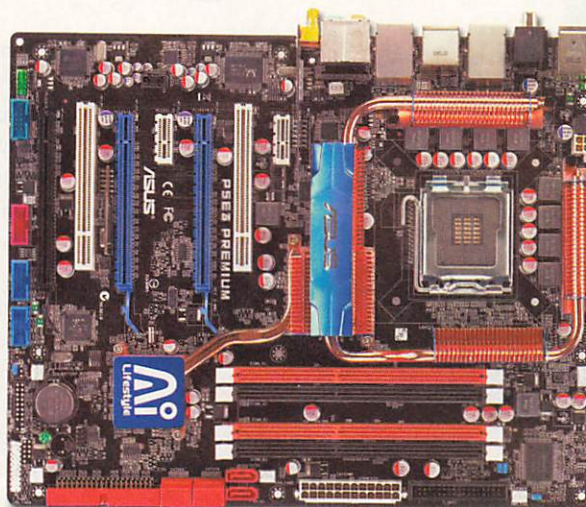
CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ● ● ● 2.5 = ABSOLUTELY AVERAGE | ● ● ● ● ● 5 = ABSOLUTELY PERFECT

Asus P5E3 Premium

Intel's X48 chipset has been a bit of an enigma in the industry since its launch, which definitely could be described as "under the radar." As a follow-on to Intel's X38 chipset that ushered the first PCI-E 2.0 motherboards, analysts and industry insiders didn't know what to make of the new high-end chipset. After all, according to Intel, the only major addition to the X38 chipset was that this new chipset would offer official support for 1,600MHz DDR3 memory and a 1,600MHz FSB. But was there more to the story?

In short, no. There isn't much more to know about the X48 chipset beyond its ability to handle higher bus and memory speeds. The Intel X48 chipset is basically a "binned"-out screening of the X38. Think of these chips as the cream of the X38 crop, now dubbed X48. The first X48 motherboard to hit our test bench was the Asus P5E3 Premium. Asus was good enough not to play games with the model branding; the P5E3 Premium is a higher-end version of its P5E3 Deluxe X38-based board, but based on the X48 chipset. In fact, you can't tell these two boards apart side-by-side, except for the silkscreened model numbers on their PCBs.

In addition to its two PEG slots and the ability to run AMD CrossFire graphics in dual-x16 mode, the P5E3 Premium also has a third full-length PCI-E x16 slot that will also run up to an x4 connection. There are also two more PCI-E x1 slots, two standard PCI slots, and just about every I/O option you could want, including six SATA 3Gbps ports, one UDMA port, two external eSATA ports, dual Gigabit LAN, 8-channel HD audio, optional Asus Wi-Fi



Benchmark Numbers

	Asus P5E3 Premium (X48)	Asus P5E3 Deluxe (X38)
PCMark Vantage		
Overall	5524	5511
Memories	4929	4932
TV and Movies	4199	4194
Gaming	5816	5809
Music	5667	5666
Sony Vegas*	3:02	3:03
POV-Ray	2687	2689
Crysis (800 x 600; low quality)	129.24	129.31

*(minutes:seconds)

AP, 12 USB ports, and two FireWire ports. Common to all Asus P5E series boards, this new premium board also comes equipped with what Asus calls an EPU (Energy Processing Unit). Essentially this is a digital voltage regulator and controller that adjusts the VRM circuit of the board from 4-phase to 8-phase, depending on load, thus improving efficiency of the array and CPU power savings features.

Speaking of loading, in our extensive testing of this board, we worked with the board's dividers (both CPU and memory) and bus speeds to see how far we could

push the chipset. We were able to hit a bus speed of 528MHz, although we had to dial back our CPU multiplier to 6X so the processor remained stable. This motherboard proved itself to be one of the most stable we've seen in a long time under heavy overclocking loads. Asus actually reports that higher FSBs are attainable with dual core CPUs, but we were testing with a quad-core Core 2 Extreme QX9650.

The P5E3 Premium incorporates just about any setting you could want in its BIOS. In the "Extreme Tweaker" section, users can change clock frequencies and voltages for virtually every major chipset, CPU, or memory subsystem component. The CPU and PCI-E frequencies can be set in 1MHz increments. CPU multiplier and memory ratios are also adjustable. There are also numerous voltage options for the CPU, memory, chipset, and system timing PLLs. But perhaps the most interesting aspect for some will be that the BIOS lets users key in voltages and frequencies directly, without

drilling down through menu options.

The P5E3's overall performance was on par with other X38 chipset boards we've tested, except when we overclocked it to extremely high bus and memory speeds, where the little extra margin that the X48 brings can pay off slightly. Simply put, the P5E3 Premium takes advantage of what the new Intel X48 chipset has to offer and then some. ▲

by Dave Altavilla

P5E3 Premium

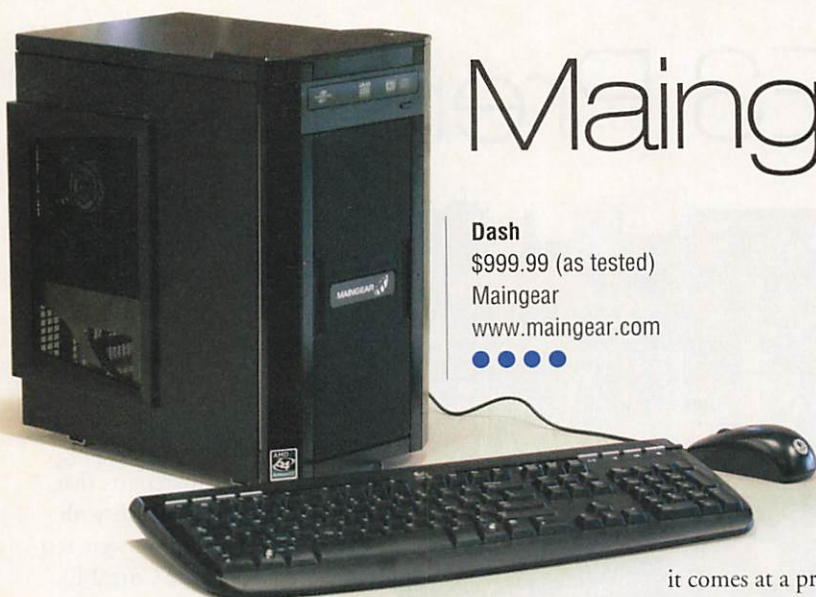
\$259

Asus

www.asus.com



Specs: Socket LGA775; Intel X48 Express; Max memory: 8GB (DDR3-1600); Slots: PCI-E x16 (3), PCI-E x1 (2), SATA 3Gbps (6), USB (12)



Dash

\$999.99 (as tested)

Maingear

www.maingear.com



it comes at a price:

The PSU sits on its side in front of the CPU, doubling as one of the system's intake fans by pulling air through a side-panel vent. That makes for a crowded interior and a potential heat problem.

The Dash's front panel has everything a home user needs, including a media card reader, three USB 2.0 ports, a FireWire port, and headphone/mic ports, all of which hide behind a small door. A Lite-On LH-20A1L DVD±RW fills the computer's only external drive bay. Maingear opted to add an AMD ATI Radeon HD 2400 PRO to my review unit, which also included a Radeon X1250 integrated GPU, but customers can opt for only integrated video when they configure the system.

Thanks to the PSU's unusual position, you can't easily reach the hard drives from the side area. However, the case floor drops away for easy access to the two drive bays.

The Dash is certainly not a heavy-duty gamer, but I was able to play Crysis and S.T.A.L.K.E.R. (albeit at low settings, such as 1,024 x 768). The PCMark05 score of 5662 won't knock serious enthusiasts off their feet, either. But the scores do point to a system that can handle normal home tasks for the next few years. It supports very casual gaming, and it will encode videos and zip files at a reasonable speed.

So, is the Dash a fix for the build vs. mainstream dilemma? I think so, and not just because the PC is a solid home-use

system. Maingear's warranty and customer care policy mean you can avoid tech support duty without feeling guilty. The system has a one-year parts and labor warranty and includes lifetime toll-free tech support during business hours (Monday through Saturday, 9 a.m. to 7 p.m. EST). On top of that, the person who built the PC is the primary support tech for the computer (a clever way to give personal service). Of course, if your tech happens to be out to lunch, another of Maingear's reps will assist you.

I also liked the Dash's online configuration menu, which helps novice PC buyers pick parts based on Good, Better, Best, and Awesome recommendations. When the buyer runs his cursor over any model name, a window appears with a plain-English description (and, often, a product photo). In other words, all you have to do is steer your family member to Maingear's site—and take all the credit. ▲

by Joshua Gulick

Benchmark Numbers

3DMark06	
Overall	1739
SM2.0	559
HDR/SM3.0	686
CPU	2080

PCMark05	
Overall	5662
CPU	5670
Memory	3680
Graphics	3342
HDD	5437

Dr. DivX*	6:00
-----------	------

WinRAR*	
3.7 Beta	3:07
3.71	3:40

Cinebench 10*	
Single-threaded	6:09
Multithreaded	3:08

POV-Ray 3.7 Beta**	886.39
--------------------	--------

* minutes:seconds

** pixels per second

What do you do when your nontechie friend or family member asks for PC shopping advice?

You could offer to build the rig for him. Sure, it won't be the most exciting PC build, but you'll get the satisfaction of using your knowledge to assemble a system that fits his needs perfectly. The downside to this plan is that you're probably shouldering 24/7 lifetime tech support when you hand the computer over to your virus-prone cousin.

Of course, who says you won't get saddled with tech support if your family member buys a PC from a mainstream computer maker? The first time that builder's tech support tries to offload him to Microsoft, he'll be pressing your speed-dial button. Also, mainstream PCs are well-known for their headache-inducing preinstalled software.

Maingear is touting its newest PC as an alternative to the mainstream home-user system. The Dash is a major departure from the boutique builder's stable of screaming-fast gaming rigs, but it has some of most important Maingear characteristics, such as third-party hardware and lifetime tech support. Oh, and it's free of bloatware, just as if you put it together yourself.

I like the case's small footprint, which is 14.1 x 7.8 x 12.2 inches (HxWxD), but

Specs: CPU: AMD Athlon 64 X2 5600+; Motherboard: Gigabyte GA-MA69GM-S2H; RAM: 2GB PC2-6400; HDD: 320GB Western Digital Caviar RE16 WD3200YS; AMD ATI Radeon HD 2400 PRO; Gigabit Ethernet; Vista Premium 32-bit

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●● 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

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- 1,000W Power Supply

Anand's Corner

by Anand Lal Shimpi

8800 GT 256MB: Not As Good As The 512MB

As promised, Nvidia's partners finally started shipping the 256MB versions of their 8800 GTs. If you've been following the 8800 GT launch and availability saga, you'll know that the 512MB cards, released at the end of October, were set to be widely available at around \$250.

If you tried to actually purchase one of these famed cards at \$250, you would most likely find yourself out of luck. Very limited supplies coupled with incredibly high demand, thanks to the 8800 GT being faster than just about every other video card priced lower than \$400, resulted in an average selling price of around \$300 for the card—assuming you could even find one.

Vendors were quick to also gouge GT seekers on shipping, with overnight shipping on 8800 GTs easily exceeding \$100 for cards in stock. Factor in taxes, and if you wanted a card right away, you'd be looking at close to a \$400 investment. Now, this is obviously a worst-case scenario, but the 8800 GT's target retail price of \$250 was simply the bait—getting one delivered to you at that price was next to impossible.

Nvidia offered a solution: In a couple weeks, we'd see a 256MB version, with similar clock speeds and even lower prices. Sure enough, I recently received the 256MB XFX 8800 GT Alpha Dog Edition XXX. The card I got was the PV-T88P-UDD, which had a 650MHz core clock, 1.6GHz shader clock, but only a 1.6GHz memory data rate. By comparison, the reference 8800 GT 512 clocks are 600/1.5/1.8, respectively. The lower memory clock does hurt performance a bit, but by far the biggest detractor is the 256MB frame buffer.

I noticed in a number of games, especially newer titles, that I'd run into a brick wall at 1,600 x 1,200, and turning on AA only made things worse. Take World in Conflict, for example, at 1,600 x 1,200 with no AA enabled; the 256MB 8800 GT gave me 83% of the performance of the

512MB card. Turning on 4X AA increased the performance gap by another 10%. That's pretty much the biggest discrepancy I encountered, as other games seem to prefer the 512MB card with a little more subtlety. Bioshock saw a 15% increase in performance at 1,920 x 1,200 over the 256MB card with no AA enabled. Older titles, such as Half-Life 2, showed no performance difference between the two cards.

These statistics are worrying to me, especially when making recommendations regarding the 256MB vs. 512MB cards. It looks like we're beginning to hit the limits of 256MB frame buffers, at least at high resolutions, meaning if you're planning on keeping this video card for at least the next year, you'll want to opt for the larger frame buffer.

One thing to keep in mind is that this 512MB target only applies to high-performance graphics cards. I absolutely hate seeing low-end cards sold with huge frame buffers that'll never get used, but obviously they end up selling really well because 512MB is bigger than 256MB, even if it's feeding a lowly GeForce 7300. So don't take my recommendation to opt for 512MB for a gaming card as a broad endorsement of larger frame buffers across the board, although I'm sure some marketing material somewhere will use a quote from this column to that effect out of context.

If you want even more performance, Nvidia just introduced its 8800 GTS 512, a higher-end version of the G92 GPU used in the 8800 GT. Nvidia claims that the GTS 512 should come in at \$300 to \$349, but I'm expecting to see those cards start at \$350 and go up to \$400, depending on clock speeds and availability. Is the performance difference worth the price? Honestly, not really. The 8800 GT 512MB still seems to be the sweet spot, even taking into account the introduction of these two new Nvidia parts. ▲



Anand Lal Shimpi has turned a fledgling personal page on GeoCities.com into one of the world's most visited and trusted PC hardware sites. Anand started his site in 1997 at just 14 years old and has since been featured in USA Today, CBS' "48 Hours," and Fortune. His site—www.anandtech.com—receives more than 55 million page views and is read by more than 2 million readers per month.

Talk back to Anand at
anand@cpumag.com

The Shark Tank

by Alex "Sharky" Ross

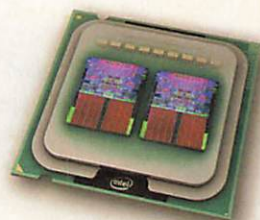
All I Really Wanted For Xmas Was...

By the time you read this, the 2007 holiday season will be over with. It happens every year and without fail, as you get older, the presents from Auntie Ethel and co. come straight from the 1970s. I'm talking about the predictable here, including the ever-useful woolly socks, knitted jumpers (with patterns, of course), and the impressive six-pack of super-white Y-fronts. Luckily, it's not all bad, and you get some presents from a younger generation of family and friends who might not understand why you're a gamer (a geek to them), but they accept it. Hence you get some respite in the form of a couple of stocking stuffers, such as Crysis or Enemy Territory. All is well and good until you realize that your 18-month-old PC isn't going to cut it. Time for an upgrade and time to get what you really, really want. . . .

Starting with the core of any system, your choice of CPU is obviously essential, and for around \$250 you can actually get yourself a stellar quad-core from Intel. The best bang for your buck is clearly the Intel Core 2 Quad Q6600, based on the Kentsfield and clocked at 2.4GHz. With some perseverance in terms of cooling, you can expect to overclock the Q6600 to over 3GHz easily. For the pure gamer that doesn't need quad-core, the 3GHz E6850 is only a few pennies more but will give you slightly better performance with less overhead. On the rare (ahem) occasion that I have a few minutes to play, that's the CPU of choice on the office computer. Alternatively, if you somehow have money to burn and 820 million transistors really mean all that much to you, then the Intel Core 2 Extreme QX9650 CPU can be had for over \$1,000. As you can likely tell by now, with no mention of AMD's products, it's obviously been a disappointing year for them; even the Phenom did little to whet anyone's appetite.

On the 3D graphics side of the fence, it's time to get a horsepower boost in the DX10 department. Try playing Crysis on anything but a new DX10 card and you'll

wish you hadn't. The best bang for your buck has to be the Nvidia GeForce 8800 GT in either 256MB or 512MB versions—if you can find them. Availability seems to be a problem for both versions, but expect to



pay around \$180 for the 256MB version and \$270

Intel Core 2
Quad Q6600

for the 512MB part. Having mentioned the lack of hardware available, it seems a little odd to recommend a pair of them for SLI usage. My favorite has to be the Sparkle 8800 GT with its passive (aka silent) cooling, which is perfect for the married crowd that needs to keep their late-night gaming sessions on the down-low. As far as ATI/AMD is concerned, the Radeon HD 3850 is worth a look if you come up short searching for an 8800 GT. At \$180, it's the true bargain of the lot. The new G92-based GeForce 8800 GTS is the Bugatti Veyron of the bunch, but, even in this context, it doesn't really make sense to buy one. The same can be said for the older 8800 GTX or Ultra being CPU-limited and priced over \$1,000 a piece.

Plugging in a new CPU and GPU to yesteryear's motherboard just doesn't seem right. For around \$250, you can get yourself a highly-capable Intel P35-based board, my favorite being the DFI LAN-Party UTP35 T2G. Its nifty GTL tuning and overclocking options are extremely user-friendly and provide you with enough tools to eke out even more performance. If you're going to go the X38 chipset route, then the Foxconn Digital Life X38A is a worthy mention due to its compatibility with DDR2 memory, as well as DDR3. Depending upon what you have left over (if anything), try and piece together some memory because 2GB is the absolute bare minimum these days. ▲



Disrupting Reuters' newswire with a cheery Christmas greeting at age six, Alex "Sharky" Ross became an avid computer user/labuser, eventually founding popular hardware testing/review Web site SharkyExtreme.com. Exposing shoddy manufacturing practices and rubbish-spouting marketing weasels while championing innovative products, illuminating new technology, and pioneering real-world testing methods was just a front for playing with the best toys. The site acquired, he left in 2001. A London native and London School of Economics graduate, Alex currently overclocks/tunes Porsche 996 Turbos with www.sharkwerks.com when he's not tweaking PCs.

Email me at sharky@cpumag.com

PC Modder

Tips & Tutorials

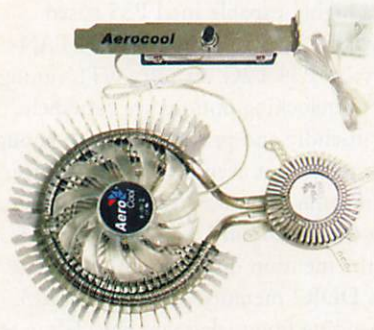
Modding does the body good. A PC's body anyway, inside and out. Here you'll find hardware, firmware, tools, tips, and tutorials for modding your rig's performance and appearance. Send us your own mod-related tips and ideas at modding@cpumag.com.

Mods & Ends

Aerocool DoublePower VGA Cooler

Modders looking for a powerful—yet quiet—aftermarket cooling option for their video cards have something new to consider: Aerocool's DoublePower VGA Cooler (\$45). Named for its unique arrangement of dual, circular, aluminum-fin heatsinks, the DoublePower cooler has one heatsink that sits atop the GPU and a second, larger heatsink linked to the first via a pair of heavy-duty 6mm heatpipes. The larger top heatsink features a frameless 80mm fan that you can throttle from 2,000 to 3,000rpm using the included fan controller. With the DoublePower VGA Cooler's fan spinning at top speed, the unit generates only 33.9dBA of noise; at its lowest speed, it generates a whisper-quiet 19.5dBA.

The Aerocool DoublePower is compatible with a multitude of video cards from both Nvidia and ATI. GeForce cards from the GeForce 4 MX 4xx series to the GeForce 8800 series are supported. Radeons range from the 9200 family to the X1950 series.

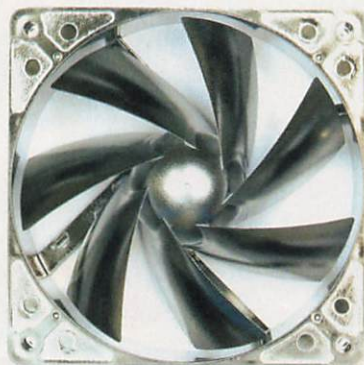


The DoublePower's dual heatsinks and a powerful 80mm fan handle the cooling on an impressive range of graphics cards.

SilenX iXtreme Pro Fans

To keep that air-cooled rig of yours purring along at peak performance, you have to ensure that massive quantities of air circulate through it. The problem with moving tons of air is that the noise produced by the average case fan can be a real nuisance. To keep your system from sounding like a DustBuster that's seen one too many hairballs, look to SilenX.

SilenX has a line of fans available that the company claims strikes the ultimate airflow-to-noise ratio. Dubbed iXtreme Pro Fans, SilenX's offerings are, compared to basic cooling fans, designed with smaller, domed motor hubs and larger fan blades with more pronounced sweep areas. The SilenX iXtreme Pro Fans also feature fluid dynamic bearings for longevity, reduced motor sizes, and a conical center that maximizes blade surface area and improves aerodynamics in comparison to the cylindrical "dead-spot" of typical fans. Finally, silicone composite fan mounts dampen motor vibration and prevent resonance or



SilenX's iXtreme fans move a lot of air without making a lot of ruckus.

rattling produced from fan vibrations reverberating through the chassis.

SilenX iXtreme Pro Quiet Fans are available in a variety of sizes from 40 to 120mm and in a 5 to 90cfm at prices up to \$30.

Hiper Aluminum Series Keyboard

If you're the type of user who prefers the tactile feedback and response of a slim notebook keyboard over a full-sized counterpart but can't stand cheap plastic keyboards, the folks at Hiper Group have the answer. The Hiper Aluminum Series Keyboard (\$25 at Newegg.com) features heavy gauge aluminum, high-impact ABS construction, a notebook-style flat key layout, and a slim profile. The keyboard is also outfitted with tilting legs and media buttons to control applications such as Windows Media Player, iTunes, and Winamp.

The Hiper Aluminum Series keyboards support both USB and PS/2 interfaces and are compatible Windows 95/98/2000/Me/XP/Vista.

Fashionably Fresh Firmware

Synology Disk Station DS207 (v2.03 - 0518)

The latest update for Synology's Disk Station DS207 fixes an issue regarding corrupt files during backup. The update also lets users enable SSH (secure shell) or NFS (network files system) services.

www.synology.com

Apple iMac (Graphics Firmware Update v1.0)

An update for the 20-inch and 24-inch aluminum iMacs running OS X 10.4.10 or later with iMac Software Update 1.2.1 for Tiger or Mac OS X 10.5 with iMac Software Update 1.3 for Leopard addresses an issue with their Radeon HD 2600 Pro cards that causes some systems to freeze.

www.apple.com

Samsung SH-S203P (vSB00)

A firmware update for the Samsung SH-S203P internal DVD burner increases compatibility and performance with a number of different types of recordable media.

www.samsungoms.com

by Marco Chiappetta



PLAY SMARTER

Hand-cranked Power Supply might seem like an ingenious way to decrease power consumption and do your part to save the environment. But there is a less ridiculous method. With Toughpower's industry-leading 87% plus power efficiency and patented 140mm dual bearing fan, you'll enjoy lower electricity bill and lowest heat output. So log on to www.thermaltakeusa.com now to find out how Thermaltake is leading the way in creating market's most trusted power supply.

Toughpower is available in 600W, 650W, 700W, 750W, 850W, 1000W, 1200W & 1500W. (Cable Management available)



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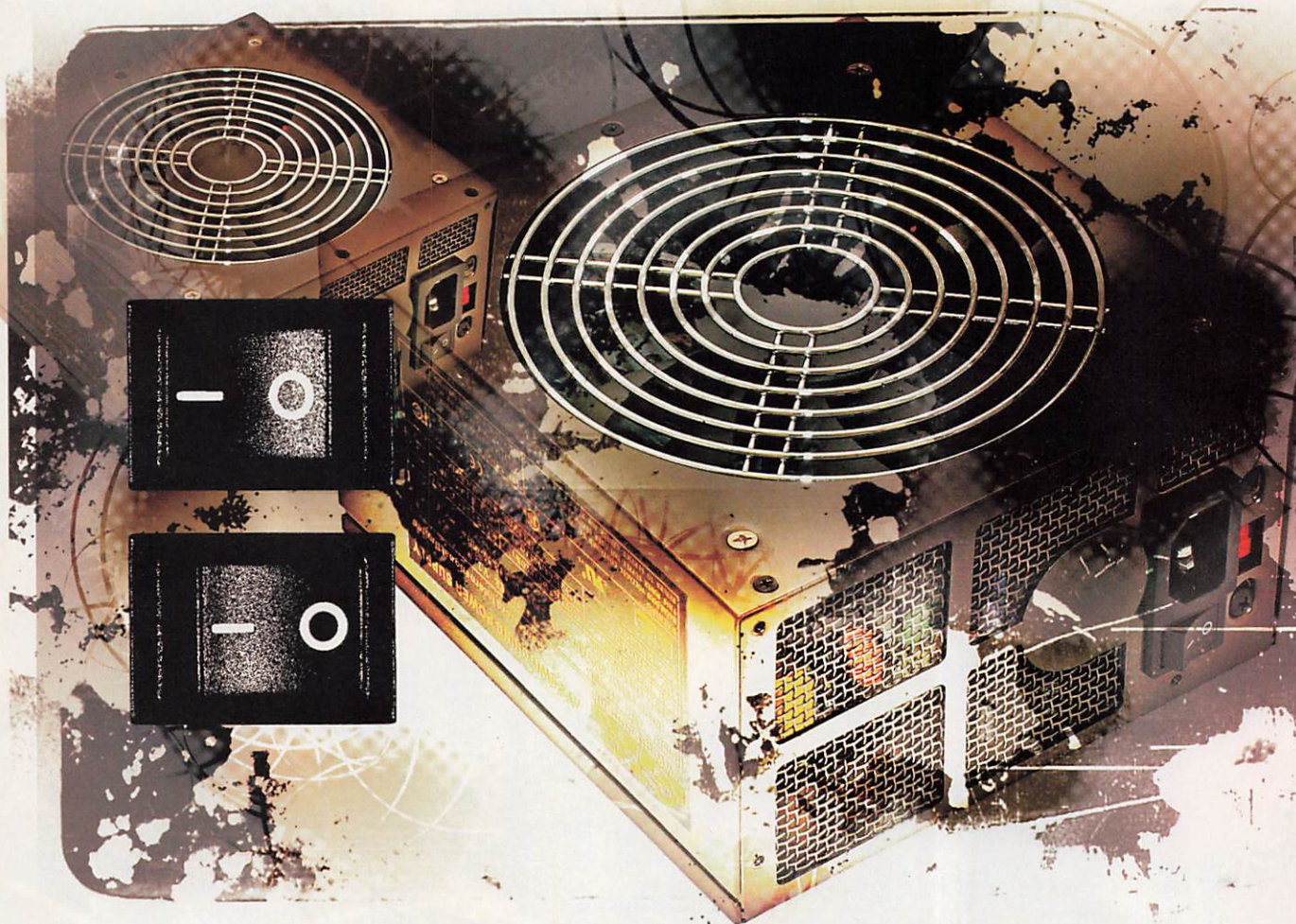
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and you're done.



Dual-PSU Mod

Two Are Better Than One

We've been extolling the virtues of using quality power supplies for years; we even dedicated a large portion of the May 2007 issue of *CPU* to PSUs. (See pages 59 to 73.) But what inevitably happens to many power users as they upgrade their machines is their once top-of-the-line power supplies are no longer up to snuff. A 600-watt PSU that had no trouble running a pair of GeForce 7800 GTXes and an Athlon 64 FX-55 would likely croak trying to power a couple of 8800 Ultras and a quad-core CPU.

So, what's a power user to do? You could always upgrade your power supply,

but today's high-end units can be pricey. Just take a jaunt across your favorite retailer's Web site and you'll see high-quality 800- to 1,000-watt PSUs selling for close to \$400. That's a hard pill to swallow, especially if your existing power supply is in perfect working order. There's another solution to the problem, however: installing a second PSU. Supplementing an existing midsized PSU with another affordable midsized unit is a much more palatable solution to budget-constrained users in need of some extra juice. You could always buy a supplemental PSU or an adapter to connect

two PSUs together, but that's the easy way out.

There are some obstacles to overcome for everything to work together without being too cumbersome. For one, you have to mount the second power supply somewhere. Thankfully, they're not as awkward to work with as you might think. You can shoehorn it into spare 5.25-inch drive bays, install it somewhere at the bottom of a case, or slide it above the primary PSU (in some chassis). We'll skip the process of mounting our secondary PSU because for this project, we used an open-air test bench. Plus, that's the easy part, and you know your own case better than

we do. Mount that second PSU wherever you see fit.

The real trick to installing a second, supplemental power supply is setting up both units to power up simultaneously. You could easily hook up a second power switch to manually power up the secondary PSU, but who wants to do that? And what if you forget to throw that second switch and end up cooking your processor and graphics card because the secondary PSU was powering your liquid-cooling system? It's with this in mind that we set out to inexpensively design and build an automatic supplemental power supply trigger, using some parts many of you are likely to have lying around in a junk drawer, save for a 12V relay. (And automobile power users should have this, too.)

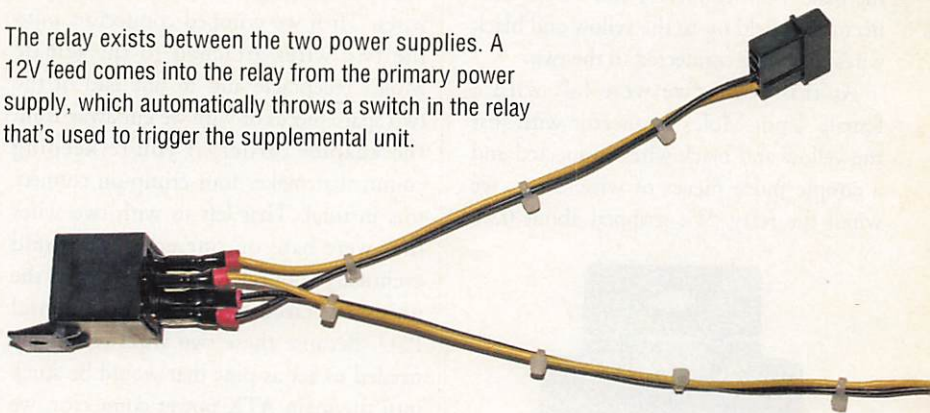
Parts & Assembly

To turn on a typical ATX power supply, you need to short a couple of wires in its 20- or 24-pin main connector. To do that automatically, we used a standard SPST (single-pole/single-throw), NO (normally open) 12V relay. Relays are essentially electromagnetic switches that are activated when supplied with power. "Normally open" means the relay's internal switch is open, or off, when no power is supplied. (And vice versa for a normally closed relay.)

To power the relay, we needed an easy, cheap way to connect it to the primary PSU's 12V feed. Looking through our spare parts pile, we found a Molex-to-PCI-E power adapter that would do the job nicely. These adapters ship with just about every mid- to high-end graphics card. We modified the Molex-to-PCI-E adapter so it could connect the relay between both PSUs. The relay, in turn, acts as the trigger for the supplemental PSU. Power comes into the relay from the primary PSU, throwing the relay's internal switch.

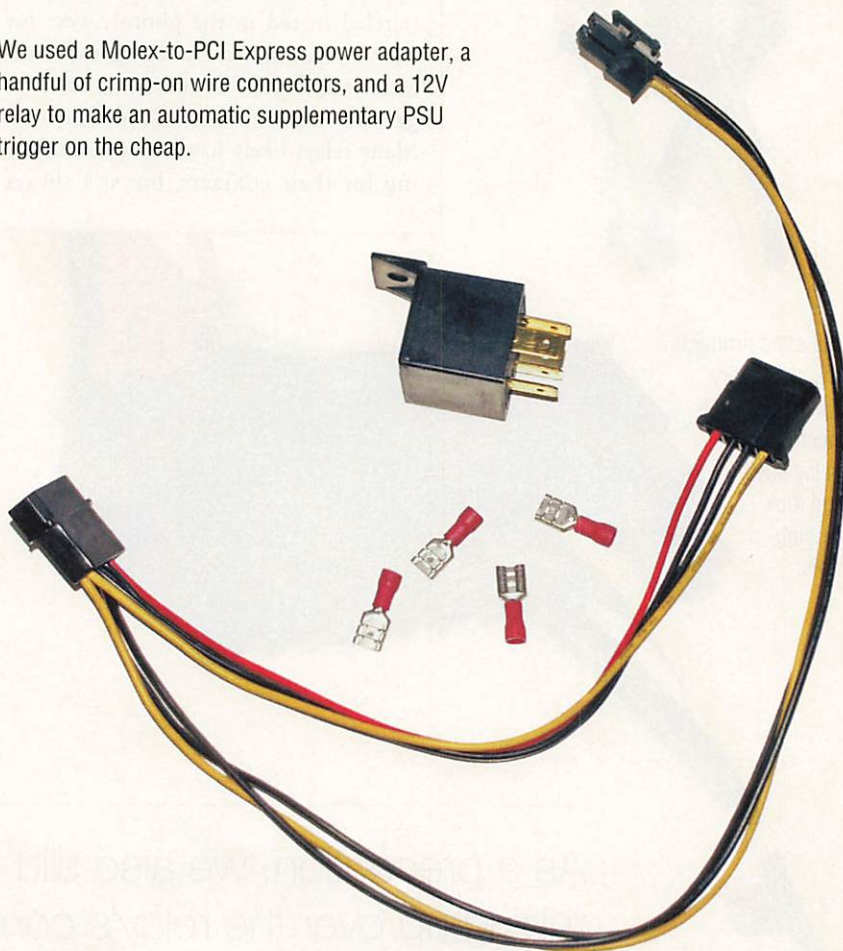
Modding the Molex-to-PCI-E power adapter for our needs, we only needed the 12V yellow and black ground wire for this mod. First, we removed the 5V red and the other black ground wire to simplify the design. Then, we cut away

The relay exists between the two power supplies. A 12V feed comes into the relay from the primary power supply, which automatically throws a switch in the relay that's used to trigger the supplemental unit.



You could easily hook up a second power switch to manually power up the secondary PSU, but who wants to do that?

We used a Molex-to-PCI Express power adapter, a handful of crimp-on wire connectors, and a 12V relay to make an automatic supplementary PSU trigger on the cheap.

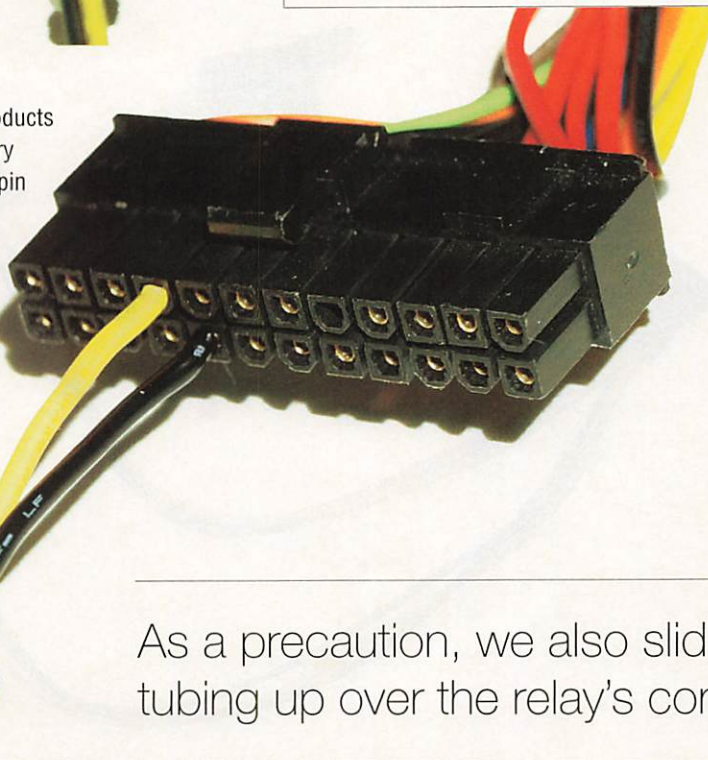


the male 4-pin connector and PCI-E connector but held on to the yellow and black wires that were connected to the two.

At this point, we were left with a female 4-pin Molex connector with just the yellow and black wires connected and a couple more pieces of wire. Next, we wired the relay. We stripped about 0.25

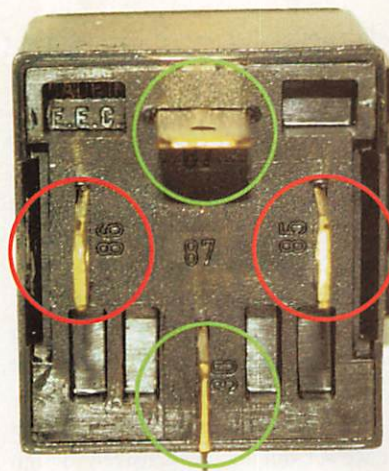


The finished products for the secondary PSU's main 24-pin connector and the relay itself should look something like this.



inch of sheathing from the ends of all the wires. Then we crimped connectors onto the two wires attached to the female Molex receptacle and to one end of the two spare pieces of wire we cut away from the adapter earlier; if you're keeping count, that makes four crimp-on connectors in total. That left us with two wires that were bare on one end. We would eventually connect these two wires to the necessary circuit in the supplemental PSU. Because these two wires essentially needed to act as pins that would be stuck into the main ATX power connector, we tinned the ends using solder to stiffen them up.

With the adapter and various wiring prepped, we began the assembly process. First, make a physical connection to the relay. A typical SPST relay will have four contacts—two for voltage input and two for the switched outputs. On our relay, the two parallel contacts on opposing sides, numbered 85 and 86 (circled in red in the photo), were for the voltage input. The other two contacts, numbered 87 and 30 (circled in green), were the switched outputs. Many relays likely have similar numbering for their contacts, but it's always



You'll need a basic SPST 12V relay for this mod. Pay careful attention when connecting wires, matching the right wires to the green- and red-circled connectors as described in the article.

best to check the schematic supplied with your relay to be sure.

We connected the yellow 12V lead from the female Molex plug to contact 86 on the relay and connected the ground wire to contact 85. (It's important to get the polarity right on the voltage inputs.) We connected the two other wires that had crimp-on connectors to contacts 87 and 30. As a precaution, we also slid some heat-shrink tubing up over the relay's contacts to insulate them. Because the contacts had a lot of exposed metal, we thought that covering them with the shrink tubing would minimize the risk of a short circuit. We also used some wire ties to secure the wires together, as well as clean up the entire assembly. With the Molex connector and additional wire leads connected to the relay, the supplemental PSU trigger was basically complete.

Make The Connections

We still needed to make a few connections before this supplemental PSU trigger could do its job properly. We had to apply power to the relay for it to function,

As a precaution, we also slid some heat-shrink tubing up over the relay's contacts to insulate them.

Parts & Prices

Assuming you have the tools to pull off this mod, the parts necessary to assemble the supplemental PSU trigger we've shown you shouldn't cost more than a few bucks. In total, we spent less than \$10 and ended up with a nifty little device that could be used for more than powering up a second PSU. Technically speaking, the trigger is just a switch that is thrown when power is applied. You could theoretically use that switch to turn on just about anything.

Molex power splitter or extension: \$1.99

12V relay: \$6.99

Crimp-on wire connectors: \$.49

Heat-shrink tubing: \$.49

Total: \$9.96

Dual PSUs Made Easy

Maybe you're not the handy, do-it-yourself type. Perhaps you simply aren't up for assembling a secondary PSU trigger and mounting a secondary PSU yourself. But if you could still use a supplemental power supply for your rig, don't fret. A few different manufacturers offer relatively inexpensive power supplies designed for just such an application. Ultra and Thermaltake, for example, have specialized units designed to fit in an empty 5.25-inch drive bay. You can use these specialty PSUs to power graphics cards and other peripherals, like an internal watercooling kit for example. The 325-watt Ultra Power Partner is available for about \$90 online, and the more modest Thermaltake 250W Pure Power Express can be had for as low as \$40.

Another solution would be to purchase a dual-PSU adapter and to use a second ATX power supply, as we have done here. Dual-PSU adapters are available for about \$10 but work in a somewhat different manner than the trigger we've assembled. These adapters take the 24-pin ATX power connectors from both PSUs and bridge them together so they power on simultaneously. They work well but don't offer the flexibility of the trigger we've designed because they can only be used for one purpose. ▲



Supplementary power supplies from manufacturers such as Ultra, like the 325W Power Partner pictured here, are readily available online.

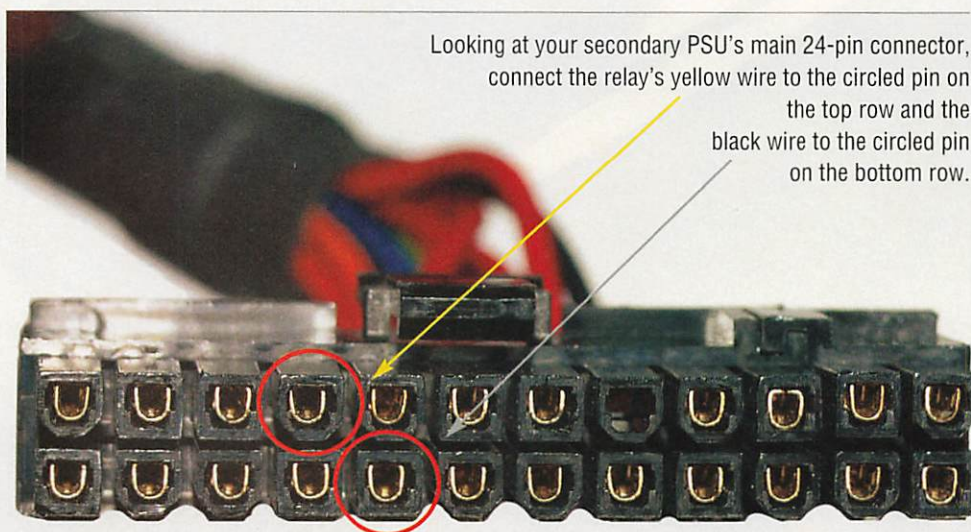
connect AC power to the secondary PSU, and connect the switched leads from the relay to the appropriate circuit on the supplemental PSU. To supply power to the relay, simply connect the female Molex connector in the trigger assembly to any 4-pin peripheral connector on the primary power supply; when the primary PSU is on, it'll send voltage into the relay and automatically flip its internal switch.

Next, connect the trigger assembly to the supplemental PSU. If you look head-on at an ATX power supply's main 24-pin connector with its retention clip facing upward, you need to connect the trigger's yellow wire to the fourth pin from the left in the top row and the black wire to a common ground, such as the fifth pin from the left in the bottom row. (These are circled in red in the illustration.) According to the ATX

specification these pins are, respectively, in positions 16 (green PS_ON#) and 5 (ground) on the main connector.

Take the two leads coming from the relay output in the trigger assembly and feed them into these two positions in the ATX power connector. Because we tinned the ends of the wire with solder to harden them, they formed perfect pins that slid right into the connector with a little force. Secure them in place with a couple of wire ties, and it's time to fire everything up.

At this point, you should have a peripheral connector from the main PSU connected to the trigger's Molex connector. This connects to the relay, which then connects to the supplemental PSU via a pair of wires. This arrangement will power up the supplemental PSU immediately after you turn on the main PSU. Now you have a secondary PSU to feed current into more power-hungry accessories or components. Enjoy. ▲



by Marco Chiappetta

Mad Reader *MOD*

Have Racing Stripes, Will Travel

As Jonah "THEkorean" Kim readily admits, the name for this modded Cooler Master Wave Master chassis isn't fancy. But glance at the Black & White Wavemaster's gleaming racing stripes or its side-panel reservoir mod, and you'll see why he didn't choose a catchy name: The system speaks for itself. Kim put nearly 200 hours into the details that give the Black & White Wavemaster its need-for-speed personality.

The PC owes its paint job to both new and old influences. "In the planning stages of the mod, I was undecided between a sleek, modern-looking paint job and an 'old school' American muscle car-style paint job," says Kim. "In the end I was still undecided, so I did both paint jobs together; the result was far nicer than either of the choices by themselves."

Of course, the paint job isn't the only eye-catcher on the Black & White Wavemaster. The PC's water-cooling system features a reservoir mod that hogs most of the Black & White Wavemaster's side panel without disrupting the paint job's clean lines. Kim created the reservoir compartment, which looks as though it bulges out of the PC's side panel, by cutting PVC pipes. "I took half of a section of PVC pipe, a section of PVC elbow connector, and two long slabs of fiberboard and glued them to the sides of the hole to create an initial shape," Kim tells us.

Body filler, paint, and hours of sanding turned the blocky PVC pipe assembly into a smooth bulge that slides under the side panel's white racing stripes. Kim wrapped up the PC by creating custom mesh covers for the internal components and covering the front panel door with faux carbon fiber material. Believe it or not, the Black & White Wavemaster is Kim's first mod. "I learned almost all of my modding skills via Internet forums, especially by reading countless numbers of project logs on bit-tech.net," Kim says. ▲

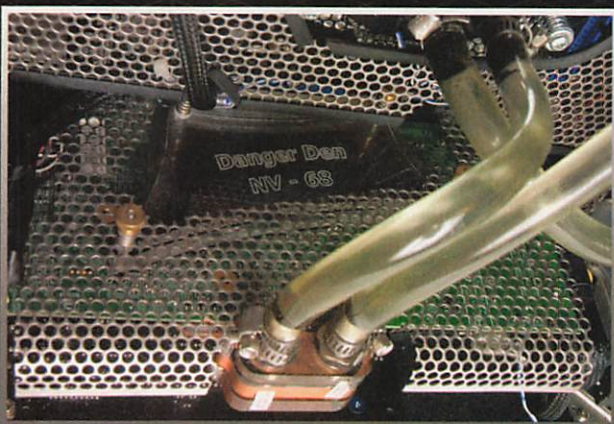


The Black & White Wavemaster owes its slick look to Kim's skill and patience—and a boatload of paint. "The entire case was then washed, polished, and then waxed," says Kim.

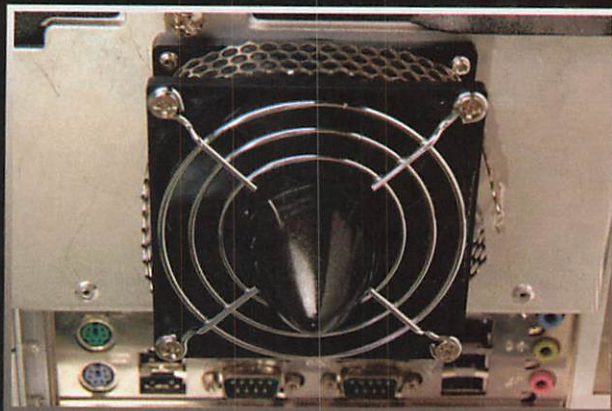
by Joshua Gulick



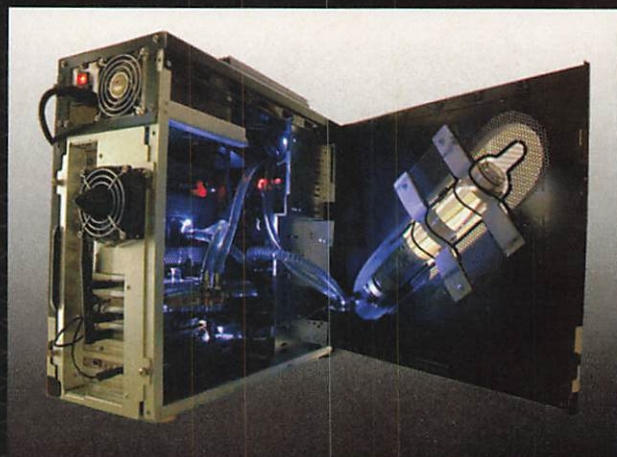
The custom acrylic mounting brackets include an unlikely modding item. "I could not figure out how to mount the reservoir to the case and still have it be removable, until I picked up one of my sister's hair ties and found out that they were both soft and elastic, perfect for my application," Kim tells us.



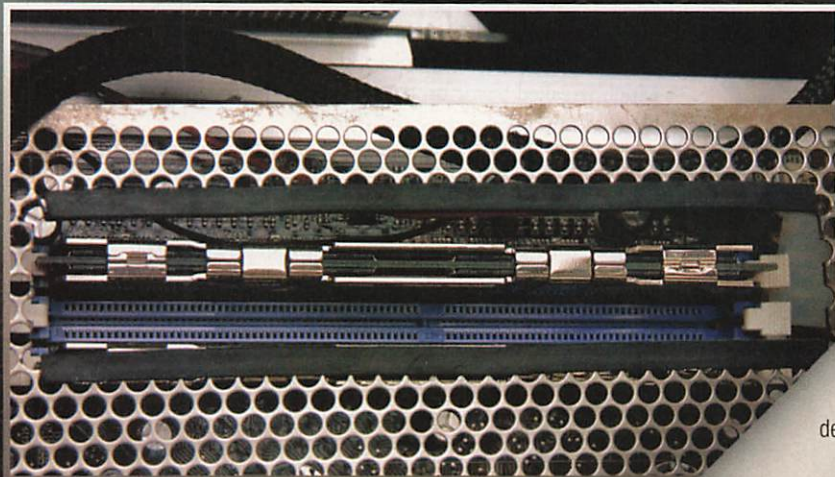
Kim used MNPCTECH's modder's mesh to cover components. "I put the mesh throughout the case because it covered a lot of the exposed silicon (which conflicted with the color scheme) while it provided better airflow over other methods of internal 'stealthin,'" says Kim.



A wave-running rig like this wouldn't be complete without an engine-like exhaust fan at the back. "I highlighted it by gluing a strip of mesh around the fan casing, then I glued a model airplane spinner cone on the center of the fan to further emphasize it."



Kim placed a total of six LEDs inside the system to provide lighting for the most important components. The white lighting turned blue during our photo shoot.



Two 512MB OCZ Platinum DIMMs slip through the hole in the system's decorative mesh.

Give Us Your Mod

Have a computer mod that will bring tears to our eyes? Email photos and a description to madreaderm@cpumag.com. We're looking for rigs that are recognizable as PCs; your Wookiee mod won't find a home here. If we include your system in our "Mad Reader Mod" section, we'll help you load up your modder's toolbox with \$1,500 and a one-year subscription to *CPU*.

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Get informed answers to your advanced technical questions from CPU. Send your questions along with a phone and/or fax number, so we can call you if necessary, to q&a@cpumag.com. Please include all pertinent system information.

“ Would overload
cause damage,
or just a power
surge? ”

Each month, we dig deep into the mailbag here at CPU in an effort to answer your most pressing technical questions. Want some advice on your next purchase or upgrade? Have a ghost in your machine? Are BSODs making your life miserable? CPU's "Advanced Q&A Corner" is here for you.

Stormfish asked: It seems I completely neglected something when building my recent system. I had a scare last night when my power strip's overload protection (I think) tripped. I'm really hoping no damage was caused. Is there any way for me to know for sure? Could the damage be hidden? Or would it be immediately noticeable? Would overload cause damage, or just a power surge? This leads to my next question. Can you make any recommendations for a decent surge protector? I found a cheap CyberPower one online with decent reviews, but I'm still unsure.

A: Fish, your situation and afterthought of a reasonably capable power surge or line conditioning system is definitely all too common. It amazes us to no end how many end users out there spend thousands of dollars on high-end computer systems, only to leave them vulnerable to spikes, dips, and generally noisy power supply conditions. It's not a sexy or exciting topic, let's face it, but all you need is one nearby lighting strike and you'll "get religion" real quick in the unfortunate event your system gets fried.

We'll get down off our collective soap boxes now and offer what insight we can. Over the years, we've seen many system components go bad for no apparent reason. In one case, we had a lab area that used to be the Bermuda Triangle of sorts for hard drives. It was absolutely amazing how many hard drives failed in this one area of our test facility, while other members of our team in other areas never had an issue with drive failures. Interestingly enough, though we had a line conditioner on the main power line coming into our facility and surge protection strips on all machines in this lab, we ended up having an issue with internal wiring of the lab.

Occasionally, when someone would hit the light switch upon entering the room, a significant dip in wall outlet power occurred, which wreaked havoc on hard drives in the systems, even those plugged into surge protector strips.

We only discovered this when we picked up a UPS system for the lab and one day, upon entering and hitting the light switch, the UPS cycled its battery, alarm, and reset circuit. It then dawned on us that these quick but sizeable dips in power supply were injecting into some of our high-end systems and cumulatively, over time, hard drives were taking a beating, ultimately failing way ahead of their expected life span.

So, to answer your first question, even though your system may be running fine now, it doesn't mean that one of your components

hasn't been weakened by that recent power surge you had. Like our hard drive incidents, latent weaknesses can exist and eventually cause catastrophic failure over time. In addition, with each repeat event, your power strip inherently becomes less capable of absorbing more spikes in the future. It's just the way the varistors and zener diodes that make up a power strip work. Over time, they become slightly weaker with each spike or surge.

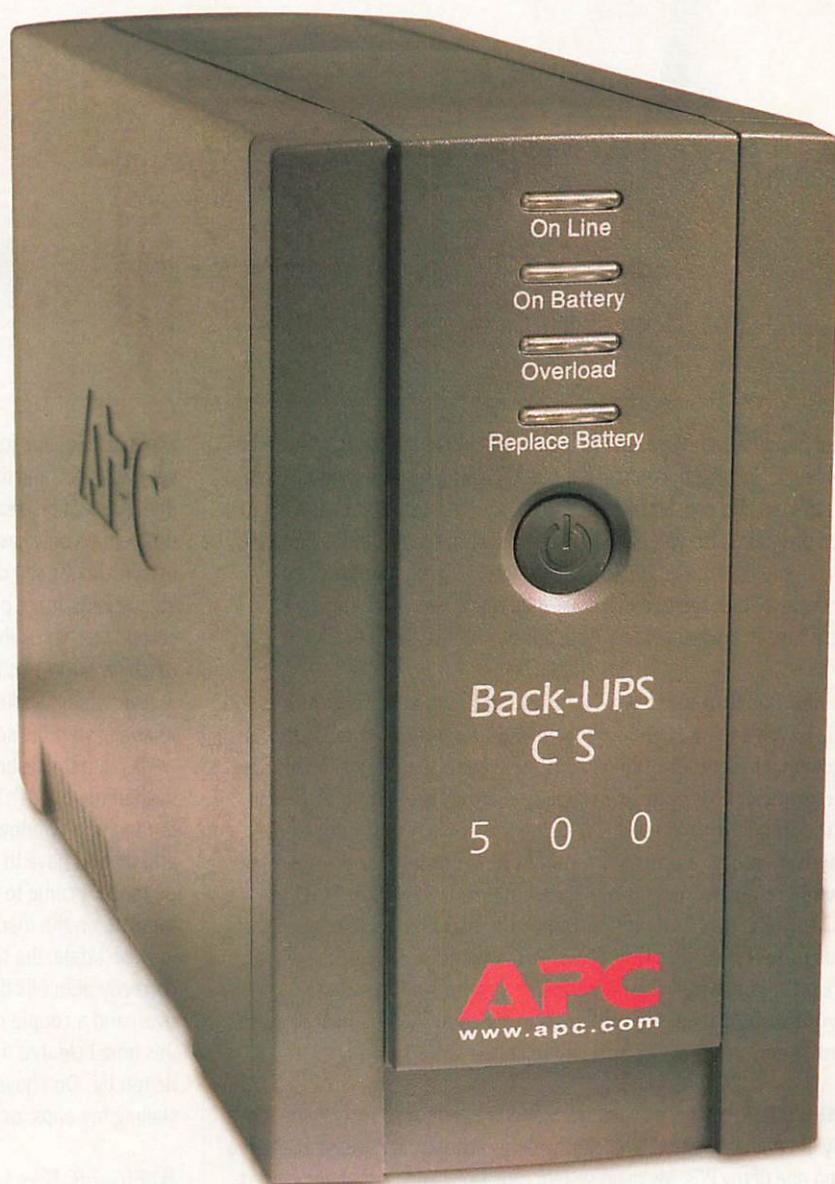
If you're a true-blue *CPU* reader and power user, you simply owe it to your high-end system to protect it with a quality power protection and conditioning system. For \$100 or less, we'd recommend going with a full-featured small office/home office-style UPS system, but it's not a complete necessity unless you need to be able to gracefully shut down and be protected from data loss.

When it comes to UPS systems and even simple surge protection strips, you do not want to skimp with a budget brand. We

really like the tried-and-true products that APC (American Power Conversion) puts out. You can get power strips from APC that have surge protection for up to 2,030 joules (that's a lot, trust us) and come with a lifetime \$100,000 warranty against system damage. An APC strip like this will run you about \$40. However, for \$70 to \$100, you can get the full line conditioning, surge, and dip protection that a quality UPS can deliver. Think about it. You have a killer gaming or workstation rig that you've dumped hundreds, even thousands, into and you're going to protect it with a \$9.99 power strip? No, you're not, because guys like us care about guys like you. And we say set it up right or don't set it up at all.

Icebane asked: My sister bought a computer the other day and against my better judgment, she went with an AMD Sempron 3600 (2GHz) machine with 512MB of DDR2 533MHz DRAM. Of course it was

APC's line of UPS systems will not only protect you from power spikes and surges, but also give you the protection of full line conditioning against spikes and dips that a quality UPS offers.





To make Vista run the way it should, you should plan on installing/upgrading to at least 1GB of RAM, and we recommend 2GB if you have the funds.



factory loaded with Vista, and being old school, I hate the machine. The problem is, instead of running flat out, the comp takes a good five minutes to load and constantly freezes for up to 30 seconds while trying to open programs. Do you have any idea how I can speed it up? My sister was upgrading from an old single-core Intel Celeron machine with Windows XP that seemed even faster than this new machine. It just doesn't make any sense! Any Vista tips to increase the speed?

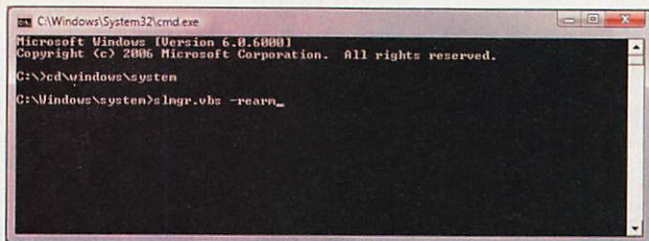
A: This scenario is extremely annoying to us, as we're sure it is for you, Ice. Why on earth any system builder would install Vista on a new machine with only 512MB of system memory is beyond us. The root cause of your primary issue with Vista's sluggishness is that, compared to WinXP, Windows Vista is rather piggish on system memory. To run Microsoft's new OS with any sort of reasonable responsiveness, we'd recommend no less than 1GB of RAM, preferably 2GB if you've got the extra budget. You might want to invest in a quality DX10-capable graphics card, as well, depending on what's installed in the system now. However, 99% of your responsiveness problem is more than likely a lack of sufficient system memory to run the installed OS smoothly.

Ben asked: Let me tell you how scatterbrained I am. I recently bought a copy of Windows Vista Ultimate through my school and decided to give it a try on one of my PCs. My main system runs Linux and it's working perfectly, so I don't want to mess with it. But I like to experiment with my other

two machines and just wasn't sure which one to install Vista on. Neither is very powerful, and they both have completely different hardware, so I figured it would be best to just install Vista on each one and try it out. The problem is I only have one Vista license. I'm not about to break the law (I'm in law school!), so I decided to install it on one machine first, try it out during the initial grace period, and then I'd wipe it out and try it again on the second machine. When I was done with the experiment, I'd know which machine worked better with Vista, and I'd install the OS permanently there.

Everything worked as it should on the first machine, but when experimenting with the second, something interesting happened. A couple of weeks into my testing, a BIOS update came out for my motherboard. I flashed the board's BIOS and cleared the CMOS, and the next time I booted into Windows, I got a message that said the OS wasn't genuine and that I'd have to activate immediately or use the machine in restricted mode. I came to find out that after clearing my CMOS, I forgot to set the date on the machine correctly, and when Windows loaded with the incorrect date, the OS got flagged as nongenuine. And setting the date correctly didn't fix the problem. I decided to just reinstall Vista and start over, and a couple of weeks later, it did the exact same thing! Although this time I cleared the CMOS because I had overclocked the system a little too far. Do I have to reinstall Vista again and kill an entire night reinstalling my apps, or is there some legal way around this?

A: First off, Ben, kudos on making an effort to use legit software. We may not all like many of the annoying and sometimes obtrusive



Running the "slmgr.vbs -rearm" command in Windows Vista will reset the timer for the operating system's initial grace period.

antipiracy measures some software companies take in an effort to protect their property, but if we want to use that software legally, we have to abide by its EULA. Fortunately for you, there is a mechanism built into Windows Vista that should help you out. As you know, Microsoft allows users to try Windows Vista for a 30-day initial grace period before activating the OS. There are a number of issues that could interfere with that grace period and cut it short, however, as in your case. Microsoft acknowledges that some users may run into trouble from time to time and, as a courtesy to their customers, has instructions available on its Web site that explain how to restart the grace period. Your particular problem requires a bit of extra maneuvering, however, because the OS is already running in reduced functionality mode and you don't have complete access to the system.

To get around your problem, first make sure your date and time are set correctly in the BIOS. Then boot into Windows. While in reduced functionality mode, launch Internet Explorer and in the address bar, type C: and press ENTER. An Explorer window will open up. In the address bar in that window, type CMD and press ENTER. This will launch the command prompt. At the C:\> prompt, type `cd\windows\system32` and press ENTER to navigate to the system32 folder. Then type `slmgr.vbs -rearm` and press ENTER. A few seconds later, you should get a message that the operation completed successfully. Restart the system and all should be back to normal. Keep in mind, you can only do this three times, at which point you'll have to activate the OS.

Nelve asked: I have an old Compaq Presario computer that's seen better days. The other day, I turned the system on and got an error that said:

Award Boot Block BIOS v1.0
BIOS ROM Checksum Error

Detecting Floppy Drive A: Media
Disk Boot Failure
Insert System Disk and Press Enter

No matter what I do, I can't get past this error message. My friend told me to pull the battery out of the system to reset the BIOS, but that didn't work. If I put a floppy diskette in the drive, it just tells me I have a disk boot failure and keeps repeating the "insert system disk" message. Is it time to send this system to the scrap heap?

A: You have a serious problem there, Nelve, with a somewhat easy solution. To get a BIOS ROM checksum error, the actual

system BIOS ROM chip on your motherboard has been corrupted in some way. And without reprogramming the BIOS to repair the corruption, there's no way around the error. Because you didn't give us any of the pertinent details regarding your system, we can't point you to specific file to download, but we can tell you how to fix your problem.

First, open up your system and find out what motherboard it's using. The motherboard's model number and revision should be printed on it somewhere. Then, using another system, search for a BIOS update for that model of motherboard online, preferably on Compaq's Web site. If you don't find it on Compaq's site but a Web search turns up some results, you should be fine as long as the BIOS is for your exact motherboard model. Download the BIOS file and also download a copy of awdf flash, the Award BIOS flash program. You can find it on just about every motherboard manufacturer's Web site. Copy awdf flash and the BIOS file to a bootable MS-DOS floppy diskette, insert the diskette into your system, and power it up. Boot to an A:\> prompt. At the A:\> prompt, type `awdf flash bios.rom` (where bios.rom is the name of the BIOS file you downloaded earlier), press ENTER, and follow the on-screen instructions to flash your BIOS. When the flash is complete, your problem should be solved. ▲

by Dave Altavilla and Marco Chiappetta,
the experts over at HotHardware.com

HighSpeed PC

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Nvidia's GeForce 8800 GT

Offering a new architecture and a slew of new features wasn't Nvidia's intent with its new 8800 GT graphics processor. For budget-conscious end users, though, the key improvement in the 8800 GT over other recent GPUs from Nvidia, a much smaller die size, is a nice trade-off. A smaller die simplifies the cooling system required for the die, and the chip costs less because Nvidia can obtain more chips from one piece of silicon.

Although the 8800 GT doesn't represent a significant architectural change

from previous Nvidia GPUs, the company did include a few important new features in the 8800 GT, which Nvidia released in October 2007 (after giving it a G92 codename).

PCI Express 2.0. The 8800 GT is the first GPU from Nvidia to support the PCI-E 2.0 bus standard.

"But they are also 100% backward-compatible to PCI Express gen one," says Ujesh Desai, general manager of desktop GPUs for Nvidia. "End users really will not see any differences if they plug them into a gen one slot."

PureVideo HD. By implementing a second generation of PureVideo HD with the 8800 GTU, Nvidia has ensured more use of the GPU for HD video processing, rather than the less efficient CPU.

"They are the world's first video processors to offload from the CPU 100% of H.264 video decoding, enabling playback on mainstream CPUs and providing unsurpassed movie picture quality and low power consumption," Desai says.

Transparency antialiasing. Nvidia tweaked its antialiasing technology with the 8800 GT, improving the quality of the antialiasing while maintaining very good performance. In past products, users often had to sacrifice performance or quality.

Even with its new features, Nvidia has managed to keep the 8800 GT at a mid-range price; boards featuring the new GPU cost \$199 to \$249. The 8800 GT has a good mixture of performance and features, especially in that price range.

Boards in the midrange price bracket haven't always been easy to find in the past few years. The 8800 GT doesn't carry the power of the 8800 Ultra or the 8800 GTX, but it doesn't carry their price tags, either, and that's a welcome addition to Nvidia's video card lineup. ▲

by Kyle Schurman

GeForce 8800 GT Specifications

Nvidia has developed the 8800 GT in the midrange price bracket among its GPU lineup, and the 8800 GT will carry far more power and features than Nvidia's previous midrange GPU (the 8600 GTS).

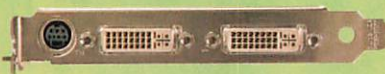
The 8800 GT offers 3.2 times the number of shader (or stream) processors (112; seven groups of 16) and double the amount of video memory (512MB) of the 8600 GTS. The 8800 GT also will run smoothly at a 2,560 x 1,600 resolution, giving end users HD options. ▲

Specification	GeForce 8800 GT
Fabrication	65nm
Number of Transistors	754 million
Core Clock (Including dispatch, texture units, and ROP units)	600MHz
Shader Clock (Stream Processors)	1.5GHz
Stream Processors (#)	112
Memory Clock (MHz/data rate)	900/1,800
Memory Interface	256 bit
Memory Bandwidth	57.6GBps
Frame Buffer Size	512MB
ROPs (#)	16
Texture Filtering Rate (bilinear filtered texels per clock)	56
Texture Fill Rate (Billions of bilinear filtered texels per second)	33.6GTps
HDCP Support	Yes (all SKUs)
HDMI Support	Yes (on-chip)
Connectors	2 x Dual-Link DVI-I 7-pin TV Out
RAMDACs	400MHz
Bus Technology	PCI Express 2.0
Max Board Power	105 Watts

Source: Nvidia

HDCP

With the 8800 GT, you'll find two dual-link HDCP-enabled DVI-I outputs on the back of the card. With its HDCP capabilities, users can transmit HD movies to exterior displays at resolutions up to 2,560 x 1,600. ▲



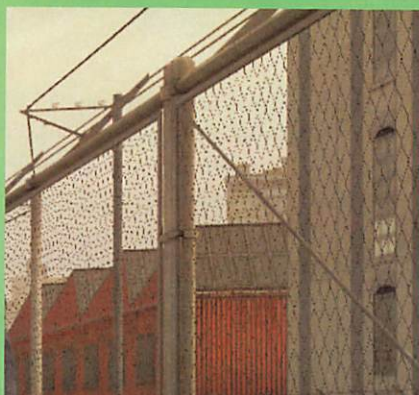
Source: Nvidia

Transparency Antialiasing

Nvidia has tweaked its transparency multisampling algorithm to create a better mix of performance and quality in antialiasing.

In the past, Nvidia made use of TRMS (transparency multisampling) and TRSS (transparency supersampling). Game developers had to choose whether they wanted high-quality transparency antialiasing (by emphasizing TRSS) or high performance (by emphasizing TRMS).

With the 8800 GT, Nvidia has created a new TRMS algorithm that provides strong quality without a loss of performance. The image on the right shows an image that uses the old TRMS; the same image with the new TRMS algorithm offers a much more realistic chain-link fence. ▲



Old TRMS algorithm



New TRMS algorithm

Source: Nvidia

Second-Generation PureVideo HD

The 8800 GT makes use of a second-generation video processing capacity called PureVideo HD that allows the GPU to handle nearly all aspects of video processing for HD DVD and Blu-ray movies.

As shown here, the new video processing architecture includes several dedicated video processing engines to go with the display processor. Each engine has a key job for video decoding and processing.

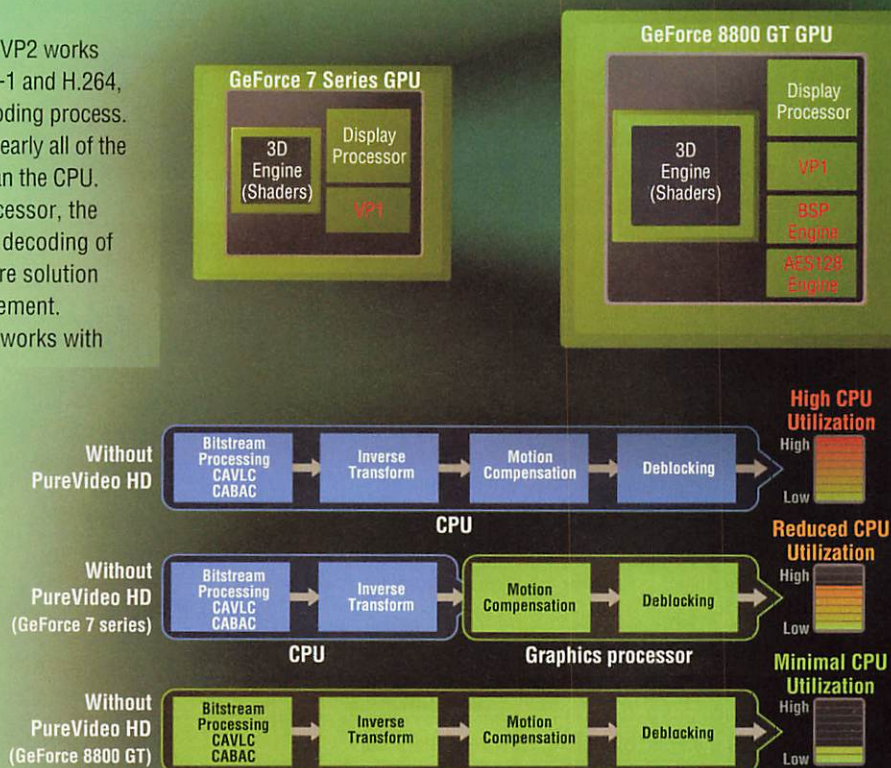
VP2. Short for Video Processor 2, the VP2 works with advanced video formats, such as VC-1 and H.264, causing an acceleration in the GPU's decoding process. With the VP2, the GPU is able to handle nearly all of the most difficult video processing, rather than the CPU.

BSP engine. Short for bitstream processor, the BSP specifically works to accelerate the decoding of H.264 video. The BSP replaces a software solution for decoding H.264 that's costly to implement.

AES128 engine. The AES128 engine works with the AES128 encryption protocol, allowing for faster decoding of the HD video's encryption. Because both HD DVD and Blu-ray make use of the AACS (Advance Access Content System) for video content security, the AES128 makes working with the security protocol fast and practical for the 8800 GT.

As you can see from the lower portion of the graphic, implementing the second generation of PureVideo HD in the 8800 GT transfers most of the video processing to

the GPU (green blocks) rather than the CPU (blue blocks), as was the case with the first generation of PureVideo HD (and before PureVideo HD, as well). The GPU is more efficient at handling video processing than the CPU, and using the second-generation PureVideo HD frees the CPU for other tasks. ▲



Source: Nvidia

ATI Radeon HD 3800 Series

Performance In A Small Package

When companies introduce new products with numerous new features (especially high-tech companies), those companies nearly always emphasize those “cool” features above everything else, particularly if those features can be measured with big, impressive numbers.

More transistors and higher clock speed in chips. More pixels in a display. More memory in your iPod. Adherence to and support for the latest standards.

With the introduction of the ATI Radeon HD 3800 series graphics processors, AMD has plenty of new measurable features and capabilities to discuss. However, it's an improvement in the manufacturing process that tops the list of the most important features, at least for AMD.

“The 55nm manufacturing is the most significant feature of the product,” says AMD's technical marketing manager, David Nolasco. “It's great to be

able to take a high-end GPU and get it down to half the size, but it still has all of the main components, it runs at the same clock speed, and it can run at half the power.”

“We adopted many of the principles of 65nm, which led us straight into 55nm,” says David Baumann, also an AMD technical marketing manager. “In terms of challenges, there basically were none. We're also hitting these (specifications) on the first generation (of 55nm).”

DirectX 10.1

The Radeon 3800 series provides the first GPU support for DirectX 10.1. The DirectX 10.1 API certainly doesn't carry the major revisions that were seen in DirectX 10, but it does offer a few important new features in three key areas.

“The overall structure of DX10 hasn't changed,” Nolasco says. “It's more of an update.”

Antialiasing improvements. One benefit of the new AA features built into DX10.1 and the Radeon 3800 series is the edge detect AA filter, which detects edges of any object (as shown by the red lines on the surface of the balls in Figure 1). By assigning more samples to the edges of objects, the rendering engine then can use antialiasing to remove the jagged edges from those surfaces. The left side of Figure 2 shows a large magnification of the ball with AA turned off; the right side shows the ball with AA in use. The jagged edges on the left side are far less noticeable with AA applied on the right side. The results using the edge detect AA filter are even more noticeable when objects are in motion in a 3D scene.

Shading and texturing improvements. One area of emphasis with DX10.1 involved providing realistic lighting in a 3D environment. The use of indirect lighting in the 3D scene, especially with moving objects, gives the scene depth. The light bounces off one object to another, “making the lighting more realistic,” Nolasco says.

With the Radeon 3800 series and DX10.1, AMD is using global illumination, rather than ray-tracing, to represent indirect lighting. Ray-tracing is a “brute-force approach,” Nolasco says, and it requires dynamic branching (an area where the CPU is more successful than the GPU).

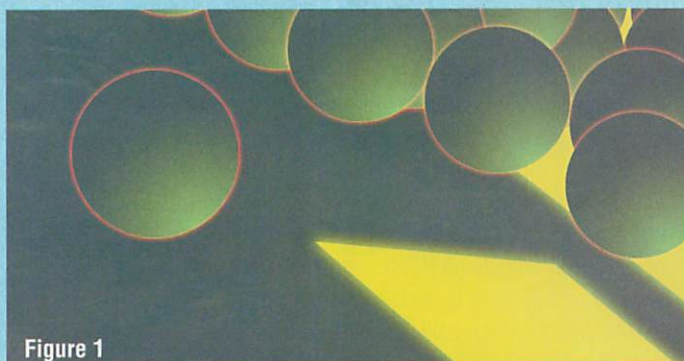


Figure 1

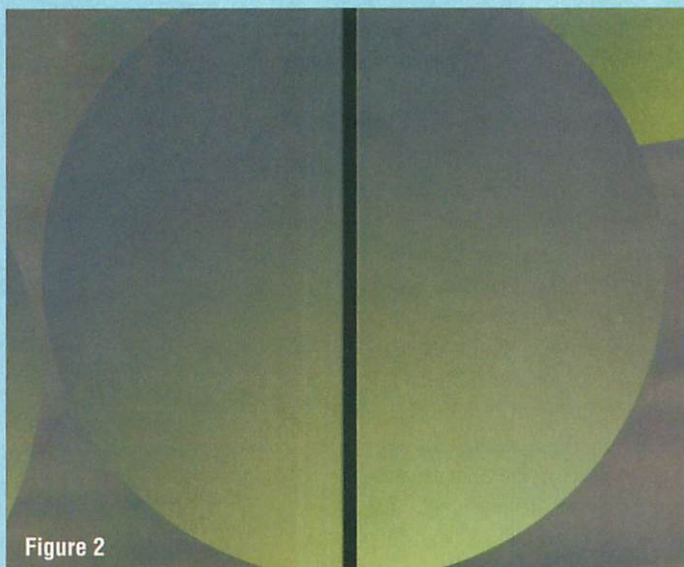


Figure 2

Source: AMD/ATI

High-End Features

In addition to being the first GPU to use the 55nm manufacturing process and to offer DirectX 10.1 support (and the first GPU from AMD to support PCI-E 2.0), the Radeon 3800 series will enable full use of ATI CrossFireX, which allows you to use more than one Radeon 3800 board at a time. The boards work together to render frames, using the method that makes the most sense (depending on whether faster performance or better scene quality is needed). Sometimes, they divide the work within one frame and then combine the results to create the frame; other times, each card would alternate, fully rendering every second, third, or fourth frame.

CrossFireX works thanks to the PCI-E 2.0 interface, which offers twice the amount

of bandwidth you'd find in PCI Express while using the same number of lanes.

"On the enthusiast side, with lots of GPUs in the system, they have to communicate with each other," Nalasco says. "Some data must go over the PCI bus, and in three- and four-card systems, PCI-E 2.0 is handy."

CrossFireX allows for use of up to eight monitors at once, too.

When paired with the ATI OverDrive utility and ATI Catalyst software, users can overclock their GPUs in their CrossFireX setups. (AMD is careful to point out that its warranty does not cover damages related to overclocking.)

Nalasco says that AMD has plans for a dual-GPU Radeon HD 3870 card that should be available sometime in January 2008.

Shrinking The Chip

In the end, Baumann and Nalasco are absolutely right, of course. It all comes back to the 55nm manufacturing process, which makes a lot of the features we've discussed here possible. Shrinking the chip also has one important nontechnical benefit: Boards with the Radeon 3800 series chips will be extremely affordable.

"The cost has come way down," Nalasco says. "We can get more than twice as many chips out of the same size piece of silicon."

The Radeon 3800 series boards have MSRPs about half of the cost of the Radeon 2900 XT, when it was released early in 2007 at about \$400. The new Radeon boards will meet the midrange segment of the market, one that many products seemed to have missed in recent years.

Global illumination makes use of cube map arrays and geometry shaders, allowing the GPU to perform the calculations in real time. With global illumination in DX10.1, the rendering engine creates "light probes" (represented by the blue circles in Figure 3) to mark the borders of the cubes that divide the scene. The engine can change the size, resolution, and detail of the cubes' surfaces to match the amount of detail and performance required for the

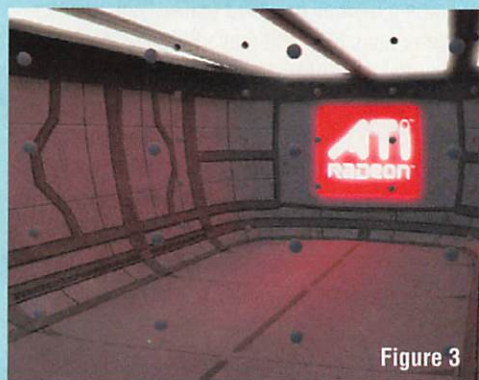


Figure 3

scene. Because of this scalability that's built into global illumination, it works well on the GPU.

As shown on the left side of Figure 4, global illumination creates shadows on the individual balls, and it shows the red light from elsewhere in the room reflected on the floor and walls of the room. The right side of Figure 4 shows the scene without global illumination applied to the balls.

"It's a minor change in the capability, but it opens up a whole new technique," Nalasco says.

Tighter specs. DX10.1 also tightens the DX10 specification, which will cause more uniformity among GPU hardware. For example, all DX10.1-compatible hardware now must support a minimum of 4X MSAA (multisample antialiasing). The new DX10.1 specifications regarding antialiasing will yield fewer differences in how GPU manufacturers treat antialiasing; game developers can count on more uniformity regarding antialiasing in hardware. Other steps taken to tighten the DX10.1 specs include requiring that all compatible hardware now supports texture filtering of 32-bit floating point formats, blending operations on 16-bit integer formats, and computing all basic math operations on floating point values (up to 32 bits) to make use of the full precision available (thereby ensuring identical results on all compatible chips).

Although DX10.1 is a handy upgrade, it's not something that will benefit end users anytime soon. Vista support for DX10.1 will appear sometime early in 2008, when Microsoft releases SP1 for Vista. Very few gaming software packages even support DX10 yet, let alone DX10.1. ▲

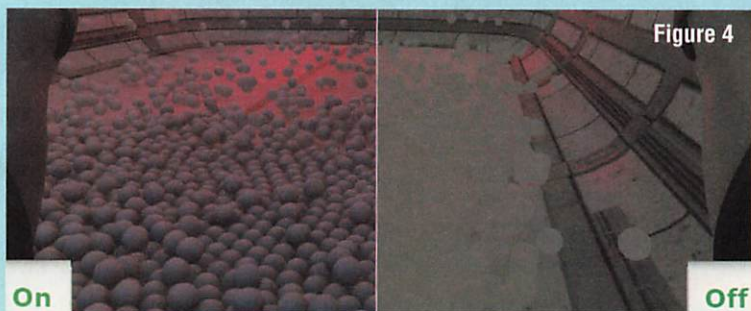


Figure 4

"It's one thing to announce it six months after the last product launch, but also to have it in the market is great," Nalasco says. "They're available in the quantity that we promised and at the price points we discussed. It speaks to the success in product development." ▲

by Kyle Schurman



The Radeon HD 3870 board carries an MSRP of \$219.

HD Video Processing

The Radeon 3800 series makes use of a few different technologies, both during decoding and in post-processing, for creating high-quality high-definition video, including the UVD and Avivo HD.

UVD

The UVD (Unified Video Decoder) with the 3800 series works with both VC-1 and H.264/AVC encoded video (as shown from the UVD graphic). Including a UVD with the graphics chip hardware allows the GPU to fully handle the video decoding process, freeing the CPU for other tasks.

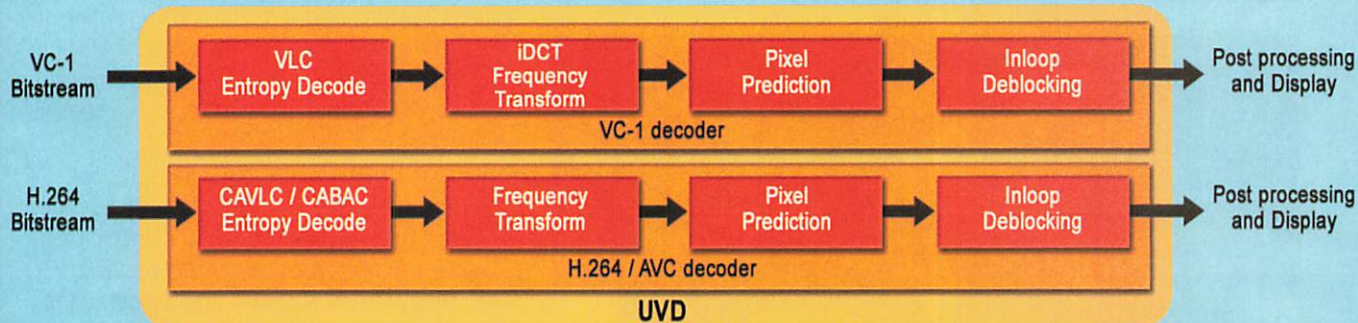
Using the GPU more heavily than the CPU has a couple of additional benefits. First, the GPU is more power-efficient. It uses less electricity to accomplish the same task, which would be especially important for a battery-powered notebook computer. Second, the GPU typically has better and quieter cooling systems than the CPU, so the system runs more quietly.

Avivo HD

ATI Avivo HD provides several techniques in the post-processing arena that greatly improve the quality of high-def video. Unlike many techniques, Avivo makes use of the temporal (timing) elements of the video, which involves quickly processing a lot of data.

Advanced deinterlacing. Basic algorithms for deinterlacing video involve an averaging of lines of a field (called "bob" deinterlacing) or a replication of lines of a field (called "weave" deinterlacing). But Avivo makes use of an advanced algorithm that uses the temporal element of the video to greatly improve image quality.

Color vibrancy. Avivo HD's display engine can process data at 10 bits per color, which allows for more than 1 billion unique colors. With Avivo, users can more closely adjust the colors in the video, giving them the ability to highlight certain colors, making them "jump" off the display, while maintaining realistic flesh colors.



Source: AMD/ATI

What's In A Name?

If you're thinking that the Radeon 3800 series, because of the series number in the name, represents a significant architectural shift from those Radeon chips that carried a 2000 designation, that's not entirely accurate. Although the 3800 series does offer a new manufacturing process of 55nm (AMD has used 65nm and 80nm with its Radeon chips in the recent past), the chip architecture isn't vastly different. (AMD gave the 3800 series the RV670 code name during development.)

According to some prerelease media speculation, AMD had planned to call the RV670 "HD 2950 Pro" just prior to its mid-November 2007 release. However, AMD chose to change its naming structure, resulting in the RV670 becoming the HD 3800 series.

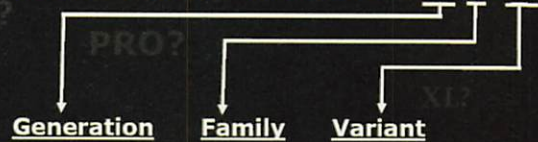
"Naming and branding is a very contentious subject," Baumann says with a laugh. "This isn't an enormous change architecturally. Realistically, though, there are significant feature

differences between this series and the 2900. . . . With the feature differences, we went with the '3000' series to really highlight that."

At the same time, AMD decided to scrap its use of suffixes (such as PRO, XT, and GT) with this chip and its future chips.

"There was no real structure to how those related," Baumann says. "We wanted to strip out the suffixing scheme." ▲

ATI Radeon HD 3870



Higher number indicates higher GPU engine performance

Currently xx50 equivalent to PRO, xx70 equivalent to XT

Source: AMD/ATI

Noise reduction. Avivo HD makes use of a complex TNR (Temporal Noise Reduction) algorithm to remove stray pixels. TNR's greatest benefit is that it greatly reduces the number of "true" pixels inadvertently removed. (In the accompanying image, you especially can see the difference in "noise" in the sky.)

HDCP

HDCP will be part of every Radeon 3800 series chip, as well.

"Every card will have HDCP built in," Baumann says. "Not all end users know or care that they need HDCP to support (HD DVD and Blu-ray). You're buying safe with the knowledge that with us on DX10 or DX10.1, it's got HDCP in there." ▲



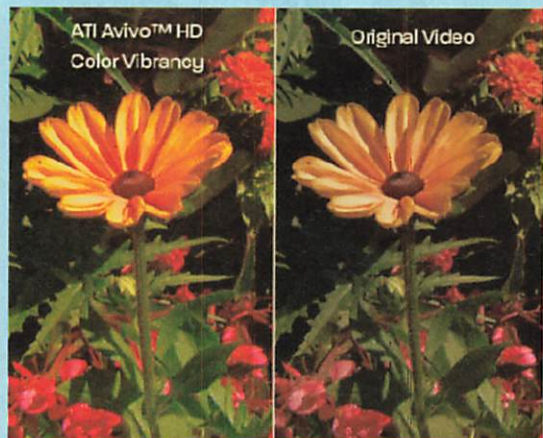
"bob" deinterlacing



"weave" deinterlacing



advanced Avivo HD deinterlacing



56 TO INFINITY & BEYOND
Wired & Wi-fi grow up

62 CONNECT & CONQUER
advanced Tips for your
inner sysadmin

gigabit gone wild

**you won't believe what
today's networks can do**

We'll admit it: If a graphics card is the Ferrari of computing, a router is the Ford Taurus: It's not particularly flashy, but you can count on it to do the job. Truly, networking hardware, almost without fail, epitomizes function over form. When was the last time you saw a tricked-out, vanity-modded hardware firewall grace the cover of *CPU*? (Actually, there was one on the cover of the January 2005 issue, but you get the point.)

And the inside of a router is about as exhilarating as the outside. We've covered ways to give your broadband connection the *CPU* touch (See "Blistering Broadband" on page 34 in the January 2007 issue.), but by and large, it's tough to find ways to "overclock" your router. You can definitely make performance comparisons between Broadcom and Atheros Wi-Fi chips, but it takes a special breed of geek to get riled up over the hottest features found in the new Realtek RTL8111C Gigabit Ethernet controller. We'll give you a hint: Dynamic cable length detection is where it's at in 2008!

Chin up, GigE gurus! Never fear, MIMO maniacs! This issue's custom-made for you, because networks need a little love from time to time, too. It doesn't matter if you have a watercooled, overclocked Core 2 Extreme QX9770 and two GeForce 8800 Ultras powering your gaming rig; that Crysis LAN party is going nowhere fast if your Gigabit Ethernet switch goes on the fritz. And who can forget the days of sharing a broadband Internet connection throughout your spacious abode before the days of Wi-Fi? Still taking that Taurus for granted? We thought so.

The biggest networking developments, with the exception of revolutionary technologies like WiMAX, typically take place in the background simply because they're not as headline-grabbing as octo-core processors or Quad CrossFire. But at the same time, we can't wait for things like 802.11n's ratification (come on, IEEE, what's taking so long?), 4G networks, and 10 Gigabit Ethernet. Maybe there's a little networking geek in all of us, after all.

Advanced networking projects aren't in short supply, either. Enterprising people have done outrageous things with networking, such as warflying (think wardriving, but with a small, single-propeller airplane) or crafting a high-powered Bluetooth "rifle" that can pick up Bluetooth signals from a half-mile away. With a little creativity and plenty of spare time, your next big mod could be your home network.

This issue, we've included a host of tutorials that don't involve a Cessna aircraft but nonetheless will give you a new perspective on that boring old router. That little four-port wonder sitting next to your PC has quite a few tricks up its sleeve, provided you give it the right tools. We'll set you free from your router's manufacturer-supplied firmware, show you how to set up a personal VPN, and safely surf the Web anonymously.

There are plenty of developments in the networking world, and we'll update you on the current state of several technologies. Bluetooth, a favorite of cell-phone-users-who-think-they're-really-important everywhere, is getting a speed boost, as are good old-fashioned wired networks (although 10GbE is just a little further down the road). WiMAX is alive and kicking and we're virtually guaranteed to see it in some form this year. And this coverage wouldn't be proper if we didn't give you the full rundown on what has become the networking world's own "Neverending Story": 802.11n's ratification. The ways your data travels from point A to point B are rapidly multiplying. We'll help you make sense of it all.

So with that said, we raise our glass to you, network. Without you, we wouldn't be streaming video to our entertainment center. Without you, we couldn't hold LAN parties to see the faces of those we dominate. Without you, our high-end, broadband-connected PCs would be forced to double as "The Internet PCs," and our Web browsers' histories would be full of visits to Kohl's and "Hannah Montana" Web pages. Network, we'll never take you for granted again. ▲

by Vince Cogley

TO INFINITY & BEYOND

Wired & Wi-Fi
grow up

Some networks have become ubiquitous for many of us, not only for linking our PCs and peripherals but also for connecting to music players, televisions, and other home devices. After all, there are few more satisfying things on a lazy Sunday afternoon than streaming videos from your PC to your big-screen HDTV without leaving the couch. If your network has become a little dated lately and you're wondering what you can do to make it faster or more productive, read on. We've gathered the scoop on networking developments that may change the way you work and play.

Wired Networking At Gigabit Speeds

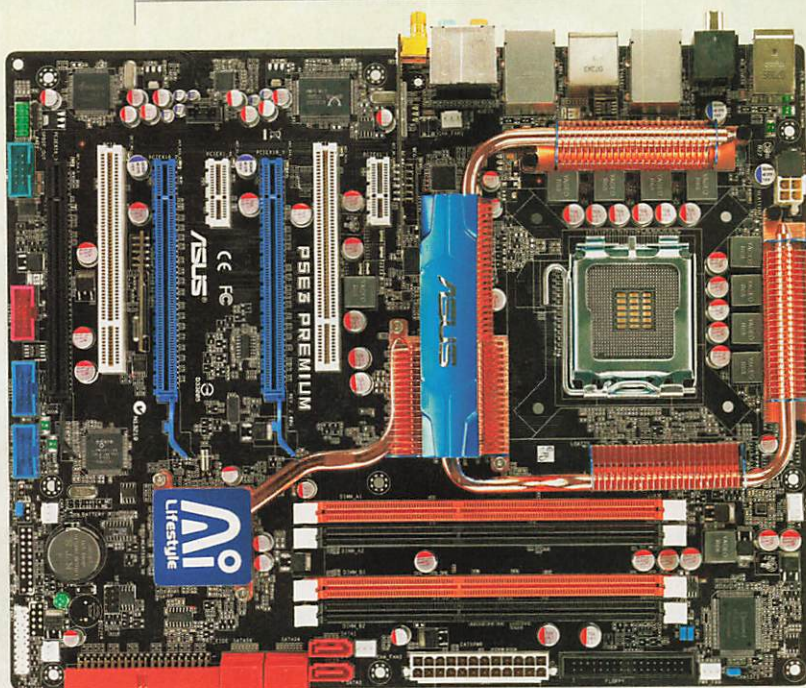
Are you content with a wired network but would like a little more oomph? Maybe it's time for Gigabit Ethernet. This technology, which offers theoretical throughput of up to 1Gbps (around half that in real-world scenarios), is becoming a standard option for wired home networking.

Gigabit networks are probably overkill for the average home network. But if you have multiple, heavily used PCs on your network and/or your family wants to stream video with a minimal risk of an interrupted signal, play bandwidth-chowing multiplayer games from several PCs at once, or transfer giant (500MB or greater) files instantaneously, a 1GbE network may be just the ticket.

When they first came out, Gigabit cards and switches were hyper-expensive and intended for enterprise use. For example, in 2000, SMC Networks' TigerCard 1000, a 32/64-bit PCI card, retailed at \$778. That's fine for corporate

deployment or the multimedia-optimized home of some music mogul, but not so good for Joe Consumer.

A few years later, motherboards with onboard Gigabit chips began showing up, and the price of Gigabit cards and routers dropped considerably. However, some of them didn't deliver on their performance potential. The frequent use of the PCI bus by both motherboards and network chips/cards created a performance



Asus' P5E3 Premium board is the cream of the crop, but its high-end 1GbE controllers and support for other extreme features make it a top choice when you feel the need for speed.

bottleneck that prevented users from obtaining true Gigabit performance. (The PCI bus offers maximum throughput of 133MBps. That's faster than the 1GbE rate of 125MBps, but because the bus is usually shared by other components on the system, the network rarely had access to all the bandwidth.)

Furthermore, many routers and switches offered only one or two Gigabit ports, with the rest being legacy 10/100Mbps. Consumer-grade routers and switches weren't sophisticated enough to process different-speed traffic efficiently, so even if one network card or router on your setup was 10/100, Gigabit equipment was worthless.

The situation has changed in the past year or so, with the implementation of the PCI-E bus (250MBps minimum throughput with PCI-E 1.0; double that with PCI-E 2.0) and/or high-speed Ethernet controllers in most motherboards. PCI-E Gigabit NICs are common, as well. But, to accomplish maximum speed, you'll still need every piece of equipment on the network to be Gigabit-capable, so plan to spend a few bucks. (Obviously, throughput also depends on other factors, including hard drive speed and defragmentation, processor speed, network load, and more.)

Gigabit No Longer Requires Gigabucks

Gigabit networks are still a bit more expensive than the Fast Ethernet systems they replace, but the price is coming down. In the rare event your PCI-E motherboard doesn't have integrated Gigabit Ethernet, you'll spend about \$50 per card to outfit your system(s), plus between \$100 to \$300 on a switch or router.

Linksys, Belkin, Netgear, and D-Link are among the many firms that make Gigabit equipment. An option for those who don't want to run cables everywhere are Wi-Fi 802.11n (draft 2.0) routers with built-in Gigabit switches. (For more about these, read on.) You won't get Gigabit performance everywhere, but all the connections should be faster than Fast Ethernet, assuming you don't mix equipment from different vendors or leave 802.11b/g hardware in your network.



1GbE switches and routers begin at around \$100. A router, like D-Link's DGL-41001005D (\$119), offers more built-in network control and security than a switch.

If you'd rather upgrade your motherboards than mess with cards, you can find boards with true Gigabit support for under \$100. Finally, if you're still using your old CAT 5 cable, upgrade that to at least CAT 5e for best performance. You can pick up a 1,000-foot spool of CAT 5e cable for under \$100.

Crave even more throughput? Companies are now developing 10 Gigabit (10GbE) devices for enterprise use, so those may hit the consumer market in the next few years.

In the wireless arena, Bluetooth, Wi-Fi, and WiMAX are all on the move. An older, less orthodox wireless technology, RF (radio frequency), is also making a play for center stage. (For more on RF, see the "Alternate Reality" sidebar.) There, we also discuss an old, but resurgent, wired technology, powerline.

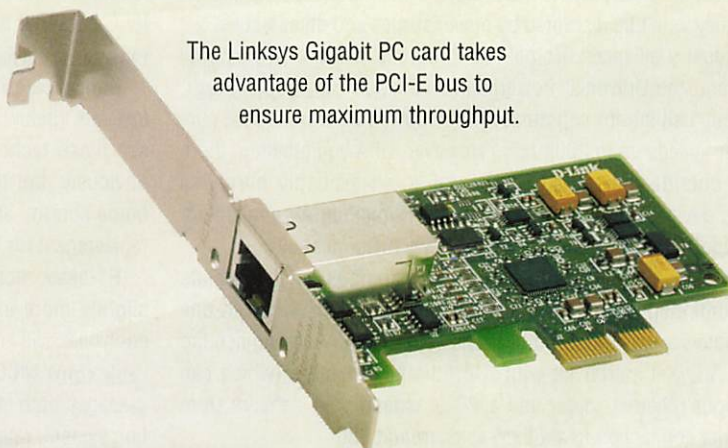
Long In The (Blue)tooth

Most of us think of Bluetooth as the technology that connects our mobile phone and headset but can be slower

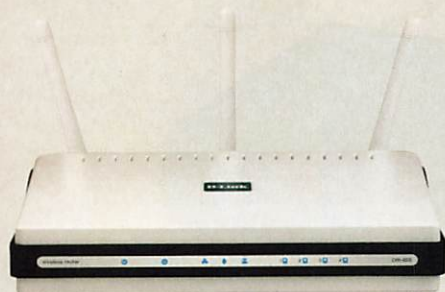
than molasses for printing documents or transferring. Get ready to adjust your mindset, because improvements in Bluetooth's features, throughput, and range will expand the potential uses for this popular technology.

In July, the Bluetooth SIG (www.bluetooth.com) adopted Bluetooth 2.1 + EDR, which among other things supports an ultra short-range technology called NFC (Near Field Communication). Bluetooth already eliminates cable clutter by connecting mice, keyboards, stereo headphones, and other low-power, limited-data exchange devices. With version 2.1 + EDR, pairing two devices can be as simple as touching them together.

Even more important changes are on the horizon, according to Mike Foley, executive director of the Bluetooth SIG. The upcoming release of the fifth version of the core Bluetooth specification is due out in mid-2008 and will support data-transfer speeds of up to 30Mbps in Bluetooth's 30-foot target range. At closer ranges (5 feet or less), 100Mbps may be possible. The



The Linksys Gigabit PC card takes advantage of the PCI-E bus to ensure maximum throughput.



The Xtreme N Gigabit router has the benefit of offering both 802.11n draft 2.0 wireless and 1GbE connectivity.

Bluetooth SIG is also working to extend the specification through the use of Wibree (an Ultra Wideband technology), which could eventually push speeds to 480Mbps.

There's still little, if any, talk of using Bluetooth as the core technology for home networks, but its advanced pairing technologies and ever-increasing speed make it

a prime candidate for ad-hoc complements to your network when needed.

N Sync

Wi-Fi currently dominates the home network scene, with 44% of networks employing it (per a June 2007 Forrester Research study). The hot new technology in Wi-Fi, of course, is 802.11n. This specification employs MIMO (Multiple Input/Multiple Output) to accelerate throughput to approximately 10 times that of 802.11g and expand coverage over much greater distances. MIMO uses multiple receivers and

Alternate Reality

Wi-Fi and Ethernet may have snagged all the headlines for years, but alternative networking options have been sitting quietly in the background awaiting their day in the sun. That day may be coming soon. Two that hold promise are powerline and RF (in particular IEEE 802.15.4 group of standards).

Power It Up

For many, powerline is an idea of questionable value whose time never came. However, for its proponents, the concept is very much alive, and its potential and competitiveness are increasing every day.

Early powerline networking devices failed to capture consumer attention because they were very slow. The original standard for powerline networking had a throughput of about 10Mbps, one-tenth the speed of Fast Ethernet connections and 802.11b. However, second-generation powerline devices offered theoretical maximum throughput of 85Mbps—faster than 802.11g and on par with some of the slower 802.11n networks. The latest generation of powerline equipment operates at speeds of up to 200Mbps (theoretical).

With powerline networks, you use specialized routers and Ethernet adapters to connect through your electrical outlets, your PCs, media centers, gaming consoles, and any other device that can use a broadband connection. Data packets travel along a wide array of frequencies, ensuring they won't be disrupted by power surges and other issues.

Two industry alliances, HomePlug Powerline Alliance (www.homeplug.org) and the Universal Powerline Association (www.upapl.org), are currently battling for supremacy in the powerline arena. (Both currently offer speeds up to 200Mbps.) However, UPA equipment is more common outside the United States, so you'll probably purchase HomePlug devices here. If you do, look for HomePlug AV equipment, which supports the 200Mbps throughputs we mention above.

For example, ZyXel (us.zyxel.com) is a manufacturer that stands behind HomePlug technology. The company's P660HWP all-in-one ADSL2+ gateway was a CES Innovations 2008 Design And Engineering Honoree. A ZyXel starter kit with two Ethernet adapters (which can connect your Ethernet router and a PC or extend your network from one Ethernet connection to another) runs around \$80.

Powerline is also a preferred choice for many home automation solutions. Remember the futuristic "smart home" Bill Gates has been touting since "The Road Ahead"? In his vision, our PCs would turn on our coffee makers and start our music players in the morning, dim our lights and close our blinds in the evening, and report to us remotely activities captured by our video cameras.

This scenario is rapidly becoming reality, and powerline is in the thick of it. Two home automation solutions, X10 (www.x10.com) and Insteon (www.insteon.net), run over powerline networks. (Insteon uses both powerline and RF to increase signal accuracy.) X10 is a bit dated, but the technology is still popular and workable. Insteon, marketed under names such as Smarthome, Icon, and Broan-NuTone, enjoys wide applicability and acceptance.

Starter kits that extend your network to include home automation begin at around \$100 for a few switches and a controller. Individual wall switches and outlet modules cost about \$30 to \$40 each; central home automation panels for larger systems can run \$200 or more.

On The Radio

RF, a wireless technology that works well between devices that require little communication with each other, has taken great strides recently. Two heavy hitters are ZigBee (www.zigbee.org), based on IEEE personal area networking specification 802.15.4, and Z-Wave (www.z-wavealliance.org), a similar RF technology.

Both create mesh networks (no central controller is needed) for low-rate (below 250Kbps) data transfer between devices. You won't see these technologies networking your PC and Internet gateway, obviously, but they have potential for home-theater automation and home control, and they are even being touted by some as a possible replacement for Bluetooth in short-range, device-to-device scenarios.

RF-based home automation and control equipment tends to be a slightly more expensive than powerline equipment. A basic device controller will run around \$100, but Monster Cable's (www.monstercable.com) MCC-AVL300 all-in-one Z-Wave remote control, which manages both your home theater and portions of your home automation system, retails at \$399.95. ▲

transmitters to transport two or more data streams simultaneously over the same frequency channel.

The spec has been on the horizon for a while, but delays in final ratification by the IEEE have somewhat dampened enthusiasm for it. Nevertheless, plenty of companies offer 802.11n products that comply with the latest draft of the specification, 802.11n draft 2.0. (For more about draft 2.0 and why it's not a bad choice, see the "Pour A Draft" sidebar.)

A new development in 802.11n devices is routers with built-in Gigabit switches. These let appropriately equipped wireless hardware enjoy a speed boost and afford your wired devices even greater speeds. Several companies (D-Link, Netgear, Linksys) make these combo routers. Two examples are D-Link's DIR-655 Xtreme N Gigabit Router (\$149.99) and Netgear's WNR854T RangeMax Next Wireless-N Router-Gigabit Edition (\$129.99). Both integrate 4-port GbE switches, as opposed to the single Gigabit port you'll find in other models.

Whether you opt for a combo Wi-Fi/Gigabit router or go all wireless, the key to maximum speed with 802.11n is device compatibility. Users and professional benchmarking firms report far better throughput when networks use equipment from the same vendor, and in some cases, the same specific line from a single vendor. Check with the manufacturer of your choice to see what it recommends.

Of course, as with a Gigabit network, you'll have to pull all older 802.11b/g cards and devices off an 802.11n network or have it dragged down to a lower speed. The good news is that prices on notebook and PC wireless NICs are generally less than their Gigabit cousins.

WiMAX Or Not?

Anyone who keeps up with wireless technologies, even on a marginal level, has heard of WiMAX. Its promises of 40Mbps throughput over a 30-mile range have had gamers, multimedia mavens, and network gurus salivating for years. Proponents first touted WiMAX (the IEEE 802.16 specification) primarily as a technology for fixed, "last-mile" broadband networking.



Draft N notebook cards give users mobility with their 802.11n connections, but public networks with these high-speed networks are still scarce.

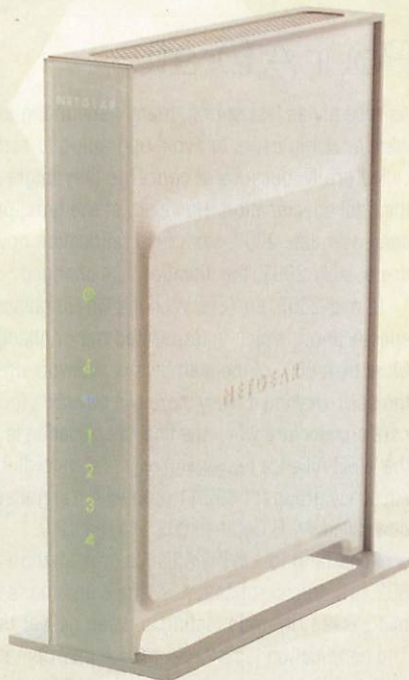
However, interest from municipalities—many cities have announced intentions to develop WiMAX networks—tantalized urban dwellers. Broadband provider Clearwire was the first to make good on the promise of fixed WiMAX and has been offering WiMAX service for home users on a limited scope since 2003.

With the ratification of the mobile WiMAX spec (IEEE 802.16e), WiMAX leapt into the spotlight as a mobile technology. At an Intel Developers Forum several years ago, Intel debuted a scooter running mobile WiMAX. Last year, Sprint Nextel announced its intention to build a mobile WiMAX network.

So, the question then becomes: Why don't we all have WiMAX chips or network cards in our PCs now, and when will we see a network? Intel, a leader in the 500+-member WiMAX Forum, has invested heavily and aggressively in WiMAX. This is one, if not the most important, reason technology pundits are so certain WiMAX has a future. Along with Fujitsu, Intel is pretty much hosting the WiMAX party and has promised we'll finally see WiMAX chipsets in notebooks by 2008.

However, a lot of municipal fixed wireless efforts (both WiMAX and Wi-Fi) have stalled in the past year or so for reasons ranging from lack of consumer interest to line-of-sight complications. If you sign up for WiMAX in 2008, it's likely you'll be

running on a mobile WiMAX network rather than a fixed one. Even by 2012, Senza Fili Consulting predicts that 61% of WiMAX subscribers will use the technology for mobile access and only 33% will employ it for their fixed network.



Netgear's RangeMax NEXT Wireless-N router excels at distances of less than 10 feet, but performance drops as distances increase.



Bluetooth's ever-widening range and throughput now make it suitable for multimedia devices such as this external speaker, but the Bluetooth SIG envisions a far greater array of future uses.

smartphones, notebooks, or Internet-connected, portable multimedia or gaming devices.

As Daryl Schoolar, senior analyst for research firm In-Stat's Networking Group, says, "If companies say, 'Here's one flat rate of \$50 a month, which will give you a

With real-world download speeds of 1 to 5Mbps (according to the WiMAX Forum), mobile WiMAX speeds cannot compare with those of a fixed, 802.11n, or Gigabit network in a home environment. However, they are very appealing for mobile users with Internet-enabled

fixed data connection to your house and unlimited cellular data for your notebook, smartphone, and other mobile devices,' that holds a lot of appeal for many users."

Nevertheless, we suspect speed-crazed users who can't wait for faster wireless

speeds would be more likely to incorporate WiMAX as a mobile adjunct to their current high-speed fixed network rather than use it as a complete replacement. That could change by 2011, however, when analysts expect mobile WiMAX may hit real-world speeds of 100Mbps.

On The Horizon

The future of networking may not lie with any one solution, but instead with a combination of several. Already the combo Wi-Fi/Gigabit routers mentioned earlier are expanding options for home networkers. Powerline or RF home automation systems may not power your entire network but will likely have a valuable place alongside Gigabit or wireless systems as home control becomes a more commonplace technology. With hundreds of manufacturers and dozens of special interest groups working on a broad array of networking technologies, we know one thing without a shadow of a doubt: The future of home networking is going to be very interesting. ▲

by Jennifer Farwell

Pour A Draft

As recently as last spring, many networking experts (including *CPU*) were advising users to avoid upgrading to early 802.11n products, called pre-N, because of concerns they might not be compatible with the final specification. However, at the time, predictions for that final spec were late 2007. With final ratification now postponed to late 2008 or possibly 2009, the situation has changed.

In mid-2007, the IEEE Working Group ratified draft 2.0 of the 802.11n specification, which incorporated minor changes from an earlier spec. More than 80% of the members of the working group voted to approve the spec, making it likely there will be only a few, if any, changes to the core architecture when the final specification is ratified. Consequently, the Wi-Fi Alliance (www.wi-fi.org), a standards-based certification and advocacy group for 802.11 products, has gotten behind it with a certification called Wi-Fi Certified 802.11n draft 2.0.

According to a Wi-Fi Alliance presentation about the benefits of 802.11n, this certification is "the consumer's indication that a product has passed rigorous testing and can deliver the best user experience." The certification tests products for interoperability (with each other and the standard), adherence to WPA2 (and older) security protocols, and backward-compatibility with 802.11a/b/g.

Wi-Fi Certified 802.11n draft 2.0 products also must be able to achieve data rates of up to 300Mbps and must pass testing for WMM (Wi-Fi Multimedia) QoS to ensure an acceptable user experience with

voice, video, gaming, and other multimedia applications. As of November 2007, the Wi-Fi Alliance reported nearly 140 products, including routers, network cards, access points, and notebooks with built-in radios, had been certified. You'll find a list of certified vendors and products at the Wi-Fi Alliance Web site.

The Wi-Fi Alliance has announced that it will update its 802.11n certification when the final draft is ratified, but members of the alliance are enthusiastic about the current draft.

"We expect the rate of adoption of next-generation Wi-Fi will continue to accelerate in new devices and multimedia applications," the Wi-Fi Alliance's Senior Director Karen Hanley said in a statement last year.

Users should resolutely stick with products that bear the Wi-Fi Certified 802.11n draft 2.0 seal of approval. Note that some companies, including Belkin, offer some products that are not specifically certified but are built with third-party radios and other equipment that bear the seal of approval. These products, although technically uncertified, are also safe to use.

Although there is no absolute guarantee that the draft 2.0 network products you use today will be compatible with final 802.11n products, the Wi-Fi Alliance and other wireless advocacy groups will continue to work to significantly reduce the likelihood you will find yourself out of pocket and out of luck. ▲

Your Data Expressways

	1GbE	Bluetooth	802.11n Draft 2.0	WiMAX	Powerline	RF
Basic cost: router or switch*	\$100 to \$200	\$15 and up for extender hubs; routers not used	\$80 to \$200	N/A	\$50 to \$200 (controller)	\$100 to \$600 (controller)
Theoretical maximum throughput	1Gbps	30 to 100Mbps by mid- to late 2008; 480Mbps eventually, after integration with UWB	540Mbps; draft-N products, 300Mbps	40Mbps at up to 20 miles	200Mbps	250Kbps or lower
Real-world throughput	500 to 600Gbps	30Mbps at very close range; speed drops with distance	100 to 200Mbps	10Mbps	100Mbps	250Kbps or lower
Pros	Other than fiber (rarely used in home networks), GbE offers the fastest connections available	Easy connection; highly portable; works with all other Bluetooth devices	Fastest wireless technology available; highly portable; users can easily connect devices to other networks	Potential to work over very great distances; devices can maintain connections while traveling at vehicular speeds	Runs on existing electrical wiring; Ethernet outlet adapters are inexpensive; can also control electrical appliances and equipment such as lights, video cameras, and music players either locally or remotely	Reliable short-range technology for communicating between devices; not impeded by intervening solid objects; uses mesh networks that become more reliable as more devices are added; controls electrical appliances and equipment such as lights, video cameras, and music players; can be added to existing networks or control devices locally or remotely
Cons	Requires extensive wiring installation; attaching wireless devices requires purchase of additional routers and access points	Security (see below); only suitable for short-range use; best with line of sight; does not have capacity to monitor and divert network traffic (cannot act as network backbone)	Throughput drops dramatically as range increases; line-of-sight disruptions and solid structures or walls can substantially reduce range; portable 802.11n devices throttle back to slower speeds in mixed public networks	Few fixed networks available at this time; mobile networks becoming available, but speed is much lower than 802.11n or 802.11g	Outlet availability may limit network distribution; not portable—designed specifically for home control use	Not suitable for control over long distances; too slow for anything other than instructions sent from one device to another
Security & privacy	Most secure network available	Security can be a concern if users are not diligent about configuring or properly disabling when not in use	Security can be an issue if not properly configured; newer security protocols (especially WPA2) are much stronger	WiMAX uses sophisticated authentication (each subscriber station must have a X.509 certificate) and encryption techniques to eliminate (or at least severely minimize) the security flaws that plague 802.11 products	Powerline signals do not travel through transformers, and current devices use encryption and unique house ID numbers; this ensures security in situations (apartments, condos) where multiple units may share a transformer	Security in RF devices depends on the chip being used and the sophistication level of the equipment; avoid using RF controllers for security-related functions such as locking and unlocking doors unless the manufacturer and installer can guarantee your installation has been assigned a unique ID
Future prospects	Good for large home networks or ultra-high bandwidth needs	Excellent for short-range, ad-hoc connections of devices to existing networks; ABI Research Alliance predicts 809 million devices by 2012	Excellent if few or no modifications are made prior to final adoption of standard; users who are concerned about having incompatible equipment should wait for final spec	Mobile WiMAX is very promising beginning in 2008, but speeds may hamper adoption for fixed environments; promoters of fixed WiMAX tout its potential, but adoption in the U.S. continues to be slow	Consumer misconceptions and reluctance have so far hampered acceptance for home networking; speed increases and other developments may spur new interest here	Excellent for many commercial, industrial, and medical uses; competition from Bluetooth may affect penetration in home environments

*Prices listed are retail ranges and are frequently lower online.

connect & conquer

advanced Tips for
your inner sysadmin

Thanks to the wide availability of broadband Internet access and cheap wireless networking hardware, many home computer users are now becoming impromptu LAN administrators. Though this may make professional sysadmins cringe, it opens the door to new networking abilities in the home that were at one point only available at the workplace, provided that you take the initiative.

Broadband providers are usually the last place to go to for help in this area; their tech support personnel typically want nothing to do with personal networking. If there's any sort of broadband problem, the first thing they want you to do is disconnect the LAN, plug a PC directly into their modem, and then see what's working. If things start working under these conditions, they're likely to send you on your way and hang up quickly.

Clearly, another resource is needed to explore your networking options.

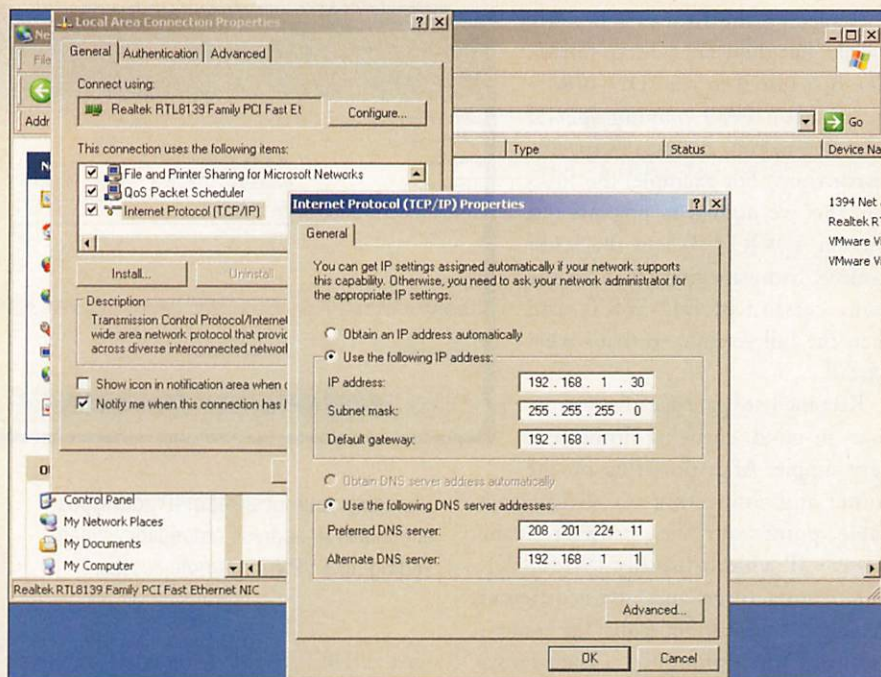
That's where we come in. Though not everyone would want to try all the projects we outline below, odds are there's at least one or two that could improve your computing experience and maybe even boost your productivity to boot. A word of caution, however: Different broadband providers have different terms of service, and they may not like (or even allow) some of the projects we outline here. When in doubt, contact your provider, review its TOS, and ask questions if necessary.

Install Third-Party Router Firmware

We assume that you already have a hardware firewall installed between your broadband modem and your network in the form of a DSL/cable router. Otherwise, this section would have been titled "Quick, Buy A Hardware Firewall Right Now!" If you're reading this, you already have (or are planning to set up) a LAN, so the simple fact that a router doubles as a hardware firewall takes care of this important need.

That said, a lot of power networking projects call for a router that has far greater power and abilities than found in mere mortal routers, so to speak. Buying a professional-grade router is certainly one way to go (though it isn't cheap), as is building a standalone computer with a few NICs (network interface cards) running firewall software such as SmoothWall. Another way to go is to juice up a consumer-grade router (perhaps the one you already have) by replacing its existing firmware with a more powerful and flexible alternative.

The classic alternative router firmware is DD-WRT (www.dd-wrt.com), which is a free, open-source firmware for many routers equipped with Broadcom Wi-Fi chips, such as Linksys WRT54G/GS/GL, Buffalo WHR/WGR, and Asus WL500 routers, among many other brands and models. The firmware is so useful that many folks buy specific hardware to run DD-WRT. Because it makes many of our power networking projects simple (or even possible in some cases),



Although letting DHCP handle IP address assignment is convenient for private use, it limits the number of services you can host down the road.

let's go over how to install it on a Linksys router.

There was a time when almost every Linksys WRT54Gx router had 16MB of RAM, 4MB of flash memory, and Linux-based firmware, making it easy to select hardware that DD-WRT ran on. Unfortunately, over time, Linksys and other manufacturers reduced production costs by using less memory and a less-bulky VxWorks-based firmware in their consumer-grade routers. After many users complained, Linksys released what were basically its original routers with a new part number: the WRT54GL (the "L" stands for Linux).

Buyers looking to save some money can look for older WRT54G units with serial numbers starting with CDF0

going up to CDFA or older WRT54GS units with serial numbers starting with CGN0 going up to CGN6. eBay is your friend here, but we found some factory-refurbished WRT54GSes with the right serial numbers for only \$39 at a local electronics store. Of course, if you already have a supported router, there's no need to buy any new hardware, so check the DD-WRT Web site's list of supported hardware (www.dd-wrt.com/wiki/index.php/Supported_Devices). Routers with less memory can utilize a "micro" version of DD-WRT, which is better than the factory firmware but lacks most of the full version's really cool and useful features, so you'd be better off selling it and buying a new router with the proceeds.



Firewalls can selectively open inbound ports; many routers limit you to 10 ports, but DD-WRT can open many, many more.

Replacing the firmware is fairly simple, but there are rules to follow. The first rule is to read DD-WRT's Installation FAQ, paying special attention to your hardware's specific instructions. For example, the FAQ said that we needed to upgrade our version 4 WRT54GS to the latest Linksys firmware first, then to the mini version of DD-WRT, and then the full version; so that's what we did.

Keeping hardware-specific instructions in mind, changing firmware is very simple. After powering on the router and connecting via an Ethernet cable, point your Web browser to the router's IP address (usually 192.168.1.1, but manufacturers may use a different default IP address) and enter the router's password when prompted. (The Linksys factory default password is "admin.") Go to the Update Firmware page, which, for a Linksys router, is available under the Administration tab, select the new firmware file that you've downloaded by clicking the Browse button, and then click the Update button. Most times, the router will "reboot" into the new firmware automatically, but if nothing happens after five minutes, just unplug the power cable and plug it back in and, if necessary, hold the reset button down for 30 seconds. The router's IP address will still be 192.168.1.1, but DD-WRT's new login name is "root," and the new password is "admin." Click the Setup tab to configure DD-WRT to your networking arrangement, or if you must load different firmware in sequence, click the Administration tab and then the Firmware Upgrade tab and select the next firmware file.

If you're updating a router that you've already been using on your LAN, then there are other steps to take before replacing the firmware. The most important is to write down all of your network settings for the WAN (the Internet connection), the LAN (the intranet connection), and the WLAN (wireless), including such things as how you obtain your Internet IP address (static IP, DHCP, or PPPoE), if you have



Changing your local set of IP addresses eliminates IP address redundancy when setting up a VPN for remote access.

local DHCP enabled, or what wireless channel you're using. You also should reset the router to its factory-default settings; holding the reset button down for 30 seconds should do the trick. Once DD-WRT is loaded, enter your old settings and you should be ready to rumble, DD-WRT-style.

And don't forget to change the router's default login name and password, or else anyone on the LAN could take over the router. We'll cover other security issues later on.

Solve The Dynamic IP Address Problem

The vast majority of home broadband connections utilize a dynamic IP address instead of a static IP address (although many providers will supply you with a static IP address at an additional cost), and that can make hosting services and servers tricky. Ideally, you should have a fully qualified domain name pointing to your IP address. Thankfully, there are free and paid services that use DDNS (Dynamic DNS) to translate a domain name to a dynamic IP address. Generally, the free DDNS services require you to use a subdomain connected to one of their top-level domains. For example, we might set up a domain name with DynDNS (www.dyndns.com) named "cpumag.dyndns.com."

The paid services let you link your own registered top-level domain (such as cpumag.com) to your IP address. But for the purposes of hosting your own server, both services work fine.

With DDNS, there's only one catch: A machine running on your LAN needs to regularly "phone home" to your DDNS provider, so that the DDNS can keep tabs on what your current IP address is. Fortunately, many routers, including those running DD-WRT, can do the "phoning home" for you,

taking a load off any server you may be running. DD-WRT makes the process easy and gives you a lot of options.

First, sign up with a DDNS. DD-WRT supports seven DDNS services automatically, and though it can be configured to work with most others, selecting a supported service makes life easier. We've had excellent luck with TZO.com and DynDNS.com, so let's suppose you made a free account with DynDNS. DynDNS will assign you a login name, a password, and your domain/hostname; write those down. Next, log in to the router with your Web browser and click the Setup tab, followed by the DDNS tab. Select DynDNS from the DDNS Service menu; enter the login name, password, and hostname you've been assigned; and indicate if you have a static or dynamic IP address. Then click Save And Apply Settings. Within a few minutes, anyone in the world should be able to type your domain name and be directed to your LAN.

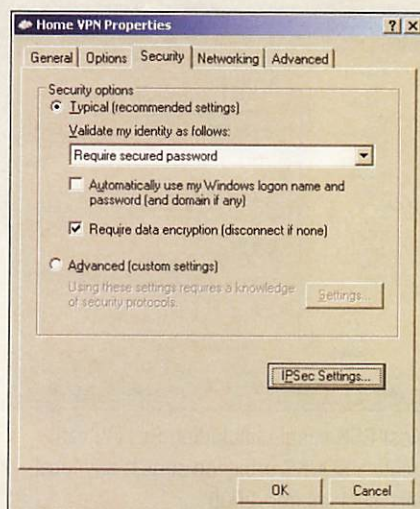
Safely Open The Firewall

Your firewall's blocking of incoming connection requests is usually a good thing, but not when you actually want some of those requests to make it through to your Web or game server. All routers allow for port forwarding, which forwards specific connection requests on specific TCP/IP ports to specific machines on the LAN, and DD-WRT is no different. However, you have to fulfill some prerequisites before forwarding ports.

Most home LANs use DHCP to assign dynamic IP addresses to all of the network's computers and devices, and this is a problem for servers. A server can't be a moving target behind the firewall. It needs a static IP address so the router can direct traffic to it correctly. The easiest way to do this is to see what IP addresses the router's DHCP server is assigning and then manually set your servers to a static IP address outside this range. In DD-WRT, go to the Setup tab and then the Basic Setup subtab. By default, the DHCP server is enabled. It starts IP addresses at 100 (that is, 192.168.1.100) and allocates 50 addresses; if this is the case, then any static IP address below 100 (except 1, because that's the router's default address) and above 150 is available for assignment.

To change the IP address of a Windows machine, open the Network Connections control panel, right-click Local Area Connection, and choose Properties from the pop-up menu. Double-click Internet Protocol (TCP/IP) from the properties dialog box and click the Use The Following IP Address radio button. Then enter an unassigned IP address (such as 192.168.1.5), set the subnet mask to 255.255.255.0, and set the Default Gateway to the router's IP address (usually 192.168.1.1). You should manually set the DNS server on this screen either to your ISP's DNS server (its tech support Web page should have this) or to your router's IP address, as well (again, usually 192.168.1.1). Macintosh users should use the Network icon in System Properties to make these changes, while Linux users should consult their particular distro's documentation regarding networks.

Finally, having set your server's static IP address, opening ports through the firewall is fairly straightforward. In DD-WRT, click the NAT/QoS tab and then the Port Forwarding subtab. Next, click the Add button to add a blank row to the Forwards table. Enter the port number you want to open in both the Port From and Port To columns (such as 80 for a Web server or 27105 for a Counter



Windows' built-in VPN data encryption isn't the most secure method, but it's good enough for most users.

Strike: Source server), set the Protocol to Both (TCP and UDP), enter the static IP address of your server computer (such as 192.168.1.5) in the IP Address column, and then put a check mark in the Enable column. Describe the server you're opening a port for in the Application column. Then click Save and Apply Settings. If you want to redirect a sequential range of ports to the same machine, such as ports 4000 to 4200, use the Port Range Forwarding tab instead.

From a security standpoint, you should only open the exact ports you need to open, lest you inadvertently open your computers up to a security breach via an unexpected security flaw. Additionally, you should manually open ports for Internet programs that require it, such as BitTorrent and LimeWire, instead of using UPnP to automatically open ports. Although UPnP is certainly convenient, it lets any program—be it a desirable P2P application or an undesirable bit of malware—open a hole in your firewall through which more nasties can communicate unchecked (which defeats the purpose of having the firewall in the first place). DD-WRT disables UPnP by default, but you should check to make sure under the UPnP subtab of the NAT/QoS tab. Finally,

you should password-protect any shared volumes in your LAN just in case all these previous precautions fail and someone gains access.

A VPN To Call Your Own

A VPN is a network connection that “tunnels through” another network, as nearly all the textbooks on the subject dryly put it. In plain English, a VPN is a mechanism that lets you extend your LAN connection via the Internet without the typical risks associated with opening servers or ports. Or, to put it another way, a VPN uses an encrypted pathway across the Internet to make two devices act like they are on the same local network. VPN isn't “remote control”; think of it as “remote access.”

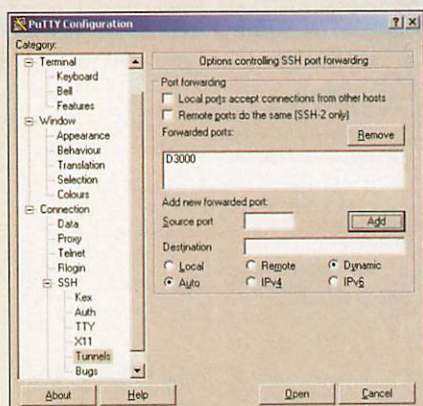
Most consumer-grade routers lack the ability to create a VPN; DD-WRT has not one, but several methods. The simplest method is via the PPTP (Point-to-Point Tunneling Protocol), and it has the benefit of being supported by Windows, Mac OS, and Linux without the need for extra software. The disadvantage of PPTP is that it's easily broken if it's set up with weak passwords. An alternative to PPTP is OpenVPN, which DD-WRT also supports, but configuring it properly requires a lot of copying and pasting. We'll provide you with some links to pursue it. In terms of security, comparing PPTP to OpenVPN is like comparing WEP to WPA: OpenVPN and WPA are definitely more secure, but PPTP and WEP are generally good enough for most home users who use caution.

As with many projects, proper preparation is necessary, and some may not be obvious at first. One of these less obvious steps is to consider changing the IP addresses of your LAN to something other than 192.168.1.x, such as 192.168.10.x. The rationale for this is subtle: Almost every coffee house, friend's home, or public hotspot allocates IP addresses in the 192.168.1.x range, since that's the default setting for a lot of hardware. As such, the host router will assign your computer an IP address within that range (for example,

192.168.1.5) and be told to use the router IP address of 192.168.1.1 as the gateway. However, if you leave your router as the default gateway, it too will have an IP address of 192.168.1.1. All of your home network's resources would also have addresses in the 192.168.1.x range, meaning you could easily have the same IP address on the two networks you're connected to; the VPN's addresses and the coffee house's address might overlap. Many times, these duplicate addresses confuse routers and VPN adapters to the point that nothing seems to work. By changing your LAN's internal IP addresses to something different, connections start up faster and tend to work more smoothly.

Changing all your LAN's IP addresses is a lot quicker and easier than it sounds. Start by logging in to DD-WRT; click the Setup tab and the Basic Setup subtab. Scroll down to the Local IP Address field and change the IP address from 192.168.1.1 to 192.168.10.1, which means you're just adding a zero to the third field. Click Save and then Apply Settings. After applying the settings, you might not be able to keep working with DD-WRT unless your computer is using DHCP (which means it will pick up a new, matching IP address automatically), so if you're using a static IP address, be sure to change it to a matching sequence (192.168.10.x, in this case) and set the default gateway to 192.168.10.1. Be sure to check this on all the hardware (computers, network printers, NAS units) on your LAN. If you're forwarding ports and/or running servers, don't forget to change all the IP addresses in the Port Forwarding subtab (under the NAT/QoS tab in DD-WRT) to 192.168.10.x, as well. We switched the router and 10 static IP addresses on our test LAN in less than five minutes.

Once the IP addresses are sorted out, you can enable the PPTP-based VPN server in the DD-WRT firmware. Click the Services tab and then the PPTP subtab. Click the Enable check mark next to PPTP Server and enter the LAN IP address of your router (such as 192.168.10.1) in the Server IP field.



Most SSH clients, including PuTTY, can create a SOCKS proxy on almost any local port, such as port 3000.

The Client IP field refers to the IP addresses that will be assigned to computers logging in via the VPN, sort of like a VPN-only DHCP server. As such, enter a range of IP addresses that won't conflict with those being assigned via the normal DHCP server, using a dash to separate the numbers in the range, such as 192.168.10.190-195. (You can check the DHCP server's IP assignments in DD-WRT under the Setup tab/Basic Setup subtab.) Finally, enter the login name and a very good password in the CHAP-Secrets field, but in the following format: login name, then a space, then an asterisk, then a space, then the password, then a space, and then an asterisk (for example, "warren * 12345 *"). For multiple users, you can add multiple logins and passwords on multiple lines. Click Save and then Apply Settings to input the changes.

Setting up the client side is much simpler, but you must do it outside your home LAN. Once you're connected to the Internet, go to Windows' Network Connections and start the New Connection Wizard. Continue through the wizard and choose Connect To The Network At My Workplace. Then choose Virtual Private Network Connection. When prompted for a Company Name, enter something descriptive, such as "Home VPN Connection"; for the Host Name or IP address, enter either your static IP address (if your

broadband connection has one) or your LAN's domain name. If you have a dynamic IP address, now would be a good time to use that DDNS account domain name you set up earlier. Finish the wizard and then right-click the new Home VPN Connection icon you just created and choose Properties. Click the Security tab, make sure that Require Data Encryption is checked and that Require Secured Password is selected in the pop-up menu (these are the default settings, but you should double-check), and click OK.

To connect, open the Network Connections window and double-click the Home VPN Connection icon. Enter your VPN username and password and then click the Connect button. The initial login may take as long as two minutes, but subsequent logins happen almost immediately. Once connected, you can connect to your LAN's network shares via their IP addresses and share names (for example, \\192.168.10.5\d, or \\192.168.10.22\epsonprinter). If the connection fails, then the hotspot you're using is blocking PPTP packets with its firewall, so try another location.

If you're interested in the higher security that OpenVPN affords, then the setup takes a bit longer. First, you must download a version of DD-WRT that has OpenVPN built in, such as the helpfully named Dd-wrt.v24_vpn_generic.bin, and install it to the router. The VPN version removes the following features in order to "make room" for OpenVPN stuff: Chillispot (a public hotspot management tool that we'll use later, so you need to make a decision about what's more important to you), Kaid (a gaming console over Internet utility), radvd (an IPv6 advertisement daemon), and SIPatH (a VoIP call router), so you might give up a little functionality. You'll also need an OpenVPN program for your computer: Windows users need the OpenVPN GUI for Windows package at www.openvpn.se; Mac users need Tunnelblick at www.tunnelblick.net; and Linux users should check out KVPnc at home.gna.org/kvpnc.

Once you have all this, you need to configure everything properly. The

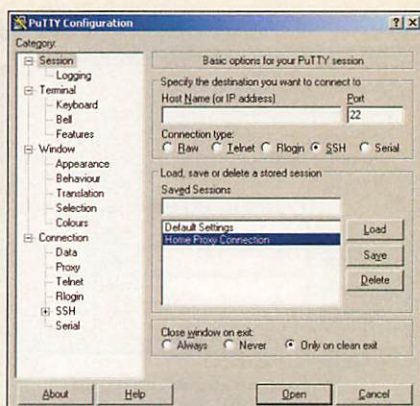
process includes creating and copying encryption keys and manually adding a script to DD-WRT. The DD-WRT wiki page at www.dd-wrt.com/wiki/index.php/OpenVPN has all the necessary lines to copy and paste into the various router screens and fields to establish the OpenVPN connection between a computer and the router (look in the Server Mode With Static Key section) or to hook two entire networks together across the Internet with two DD-WRT-equipped routers.

Wireless Hotspot How-To

Opening your WAP to anyone is a nice gesture, in theory. In practice, there are security concerns. For example, you wouldn't want perfect strangers to have access to your shared network volumes or be able to probe the LAN in general to see what's there. You need some sort of buffer. There are several ways to accomplish this goal. One requires all the facilities your broadband provider may supply, while the other uses the Chillispot functionality built into DD-WRT and a service called WorldSpot (www.worldspot.net).

The first way requires three things: a broadband connection with multiple IP addresses, a second wireless-enabled router, and a hub or switch. First, check to see if your broadband provider can provide you with multiple IP addresses, either static or dynamic; this is a common option among smaller DSL providers or a business-level broadband account. If your ISP can, then your personal LAN can connect to the Internet via one IP address while the second WAP connects to another IP address, effectively isolating each from the other.

To do this, first connect a hub or switch directly to your broadband modem. An inexpensive 5-port switch costs \$30 or less online and will be fine for up to four local, ISP-assigned IP addresses. Next, plug your LAN's router into the switch, connecting to the Internet via DHCP or its own static IP address. Despite the presence of the switch, you can use your LAN normally, including your normally-encrypted



By saving a session with a specific name, you can re-create a SOCKS proxy with just two or three mouse clicks.

Wi-Fi signal. Finally, plug the second wireless router into another port on the switch, configuring it to use another static IP address or to get another address automatically via DHCP. Be sure to set the second WAP to use an unencrypted signal, a different SSID, and another wireless channel to avoid interference with your LAN's Wi-Fi signal. Of course, if you don't have any wireless devices on your LAN, a wired LAN will do the trick, too.

Perhaps you can't get a second IP address from your broadband provider or just want to maintain some oversight of the free Wi-Fi access point. Maybe you'd like to make a little money on the side and charge for the public to use your hotspot. (Definitely check your ISP's TOS before doing the latter.) If so, you need to combine DD-WRT with a free service, such as WorldSpot, which lets you set up an isolated Wi-Fi hotspot and manage it just like you were a coffee house. You can charge Wi-Fi users for access, and WorldNet divides the net revenue—75% to you and 25% for them—or you can pay WorldSpot a monthly fee and keep 100% of the revenue. Free access is limited to 30 simultaneous connections but is otherwise wide open.

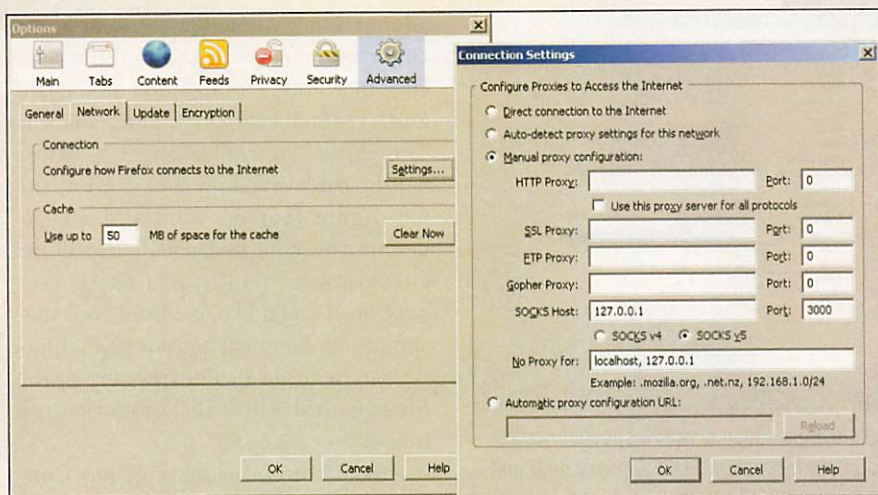
To make a free and fully open hotspot, start by creating a WorldSpot account for yourself. Click the Login link and supply a login name, password, and email

address. Once you follow the steps of the confirmation email, log in to the system, click the Create HotSpot link on the left, and create a Hotspot name, such as "FreeSpot" or something that users would find inviting. Next, click the Configure Hotspot link and set the options you want to enable. Leave all the check marks blank for a basic, free hotspot. If you'd like to edit the text that appears on the initial hotspot page, this is the screen to do it: Edit the text in the Message field. Click the Submit button to save your changes.

At the bottom of the Hotspot Configuration page is the Access Profiles setup link, which you need to click to set up at least one user profile. It is here that you can create a "free" profile, creating a class of user that gets free access. Enter a descriptive profile name, such as "Free," and a brief description in the Description field, such as "Unlimited Free Access." Set the Total Allowed Connection Time (we used "2h" for two hours) and check the Offer This Access For Free checkbox. Click the Update button to save the changes, thereby associating the free profile with your new hotspot. Finally, click the Display Config Info link on the left side of the page and leave that information visible in its own window, since we'll need it momentarily.

Next, log in to DD-WRT via a wired connection because we'll be changing the wireless settings. Disable any wireless encryption you may have enabled previously by clicking the Wireless Security subtab of the Wireless tab and setting the Security Mode to Disabled. Click the Save button and then Apply Settings. Then, click the Basic Settings subtab and set the SSID to something inviting, such as "FreeHotspot" or "PublicWi-Fi"; click Save and Apply Settings to make that change.

Next, click the Services tab and the Hotspot subtab. Click the Enable checkbox next to the Chillispot entry, which opens several new fields. If you look closely, you'll see these Chillispot fields correspond to the entries on the WorldSpot Display Config Info page you left



Although Firefox buries the requisite configuration screen, setting it up to use your SOCKS proxy is easy.

open earlier. Therefore, copy and paste all the settings on the Display Config page into the DD-WRT window, with the only hitch being that you need to type your ISP's DNS server into the DNS IP field. Finally, click the Save and Apply Settings buttons and reboot the router using the Reboot button under

the DD-WRT Administration tab. The router should finish rebooting in less than a minute.

Now you can test the Wi-Fi connection. Fire up a Wi-Fi-enabled computer and connect to the SSID you specified, which should display as an "Unsecured Wireless Network." Once connected, fire

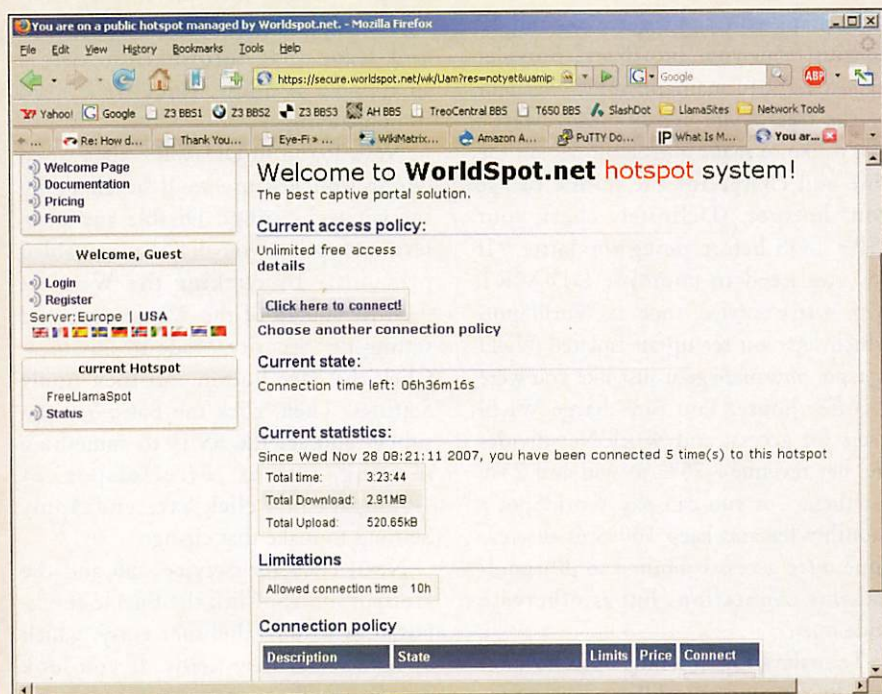
up a Web browser. It should automatically display the WorldSpot Hotspot welcome page, which itself displays a "Click Here To Connect!" button. Click it once, and after a moment, the page should say, "You are now connected to this hotspot." Try surfing to other Web sites, checking your mail, or any other online activity; all should work as normal. You should verify that your IP address is different than the range assigned to your wired computers and that you're unable to connect to any part of your LAN, just in case something went wrong. To exit the hotspot, type `exit` in a Web browser Address bar and click the Disconnect button.

Surf Remotely Via A Secure Proxy

This is also known as the "safely check out ESPN.com from work" project, where we create an encrypted link between a remote computer (such as the one at your office) and your DD-WRT-equipped router, letting you anonymously access the Internet using any program that can use a SOCKS proxy (which is most of them). DNS requests made on the remote computer will still be visible to savvy IT admins checking the nameserver logs, but the actual content won't be. There's even a workaround in Firefox that bypasses the remote DNS, too.

Start by enabling the SSH (secure shell) daemon in DD-WRT. Click the Services tab followed by the Services subtab. Click the Enable checkbox next to SSHd and make sure Password Login is set to Enabled and the Port is 22. Click Save and then Apply Settings. Next, click the Administration tab and the Management subtab, set Remote Management: SSH Management to Enable, and click the now familiar Save and Apply Settings.

Next, download the latest version of PuTTY, which is a free SSH connection utility for Windows, from www.chiark.greenend.org.uk/~sgtatham/putty and install it on the remote computer. Although there are many versions on the Download page, you want the file that corresponds to "A Windows installer for

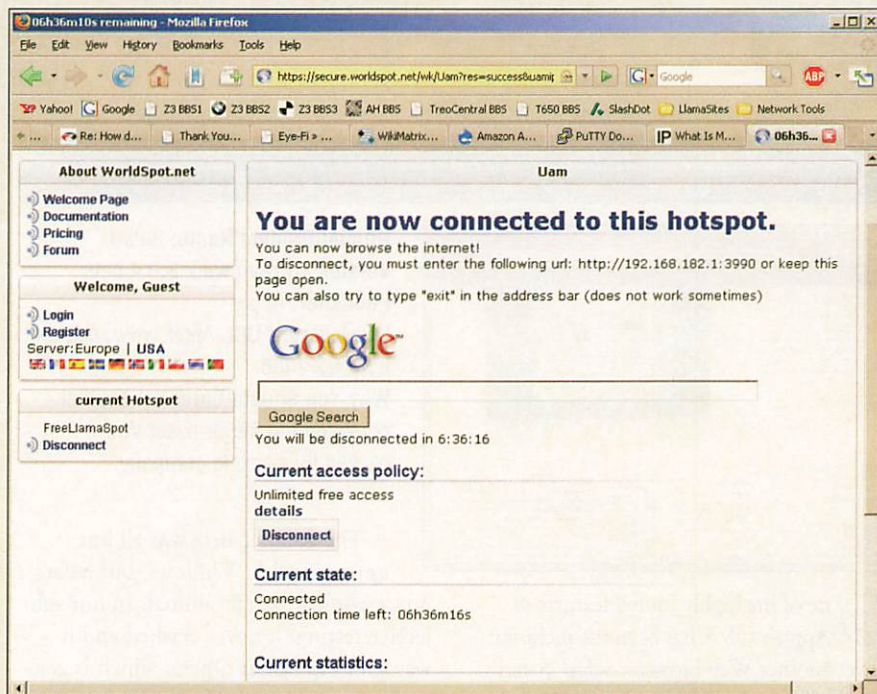


New users connecting through your open access point are greeted with the WorldSpot Welcome screen.

everything except PuTTYtel," which is currently a file named Putty-0.60-installer.exe. Let the installer add a PuTTY icon to your Desktop and then double-click it to start PuTTY. In the initial PuTTY window, enter your home broadband connection's static IP address or domain name in the Host Name or IP Address field. Next, click the plus (+) symbol next to the SSH subentry in the Connection category tree on the left and select Tunnels. Enter an unused port number (such as 3000) in the Source Port field, click the Dynamic checkbox, and then click Add, which then adds "D3000" to the Forwarded Ports field. Finally, click the Session entry in the Category Tree (it's at the very top) and type a name (for example, "Home Proxy Connection") in the Saved Sessions field and click Save. This saves all the settings needed to create a local SOCKS Proxy on the computer, which connects to your router via SSH.

To initiate the connection, open PuTTY and then double-click the "Home Proxy Connection" entry in the Saved Sessions list. A terminal window opens, prompting you to accept an unknown security certificate the first time you do this—accept it. Next, you'll receive a login prompt. The login is "root" and the password is whatever you changed your router's configuration password to (you did remember to change it from the default setting of "admin," right?). This window represents the running SOCKS proxy host, and you can minimize it to get it out of the way.

Now all you need to do is configure any Internet application to use the local SOCKS host. Forget how to do this? Well, every program is different, but we'll configure Firefox 2 as an example. Start by opening Firefox and choosing Options from the Tools menu. Click the Advanced tab, followed by the Network subtab. Then, click the Settings button. Click the Manual Proxy Configuration checkbox and set the SOCKS Host to 127.0.0.1 (which is the IP address of the network loopback connection—in other words, your remote machine itself) and the port number to



Once connected, the WorldSpot screen invites you to Google your heart out.

the port you opened earlier, such as 3000. Click OK twice to accept the changes and clear the configuration screens.

Then, start surfing almost totally anonymously. You can verify the connection by going to a Web site such as www.whatismyip.com and verifying that the IP address is that of your router, not of your office, the coffee house, or wherever you're connecting from.

As we mentioned earlier, savvy network administrators could still check their own DNS servers to see where you're connecting. Although all the data going in and out is SSH-encrypted, all your DNS requests are probably being fulfilled by your office's DNS server. Someone could tell that your system looked up the IP address for *Sports Illustrated*, for example, even though they couldn't see any of the specific traffic traveling between your Web browser at work and your router at home.

If you use Firefox, there's a solution: Open up a new browser window, type `about:config` in the address field, and press ENTER, which displays all of Firefox's internal settings. In the Filter

field, type `network.proxy.socks_remote_dns` to display this setting in the lower part of the screen. Double-click the word False to change it to True, close the window, and restart Firefox. This forces Firefox to use the router's DNS services instead, which means these requests are also encrypted.

When you want to end your encrypted connection, restore the PuTTY window and type `exit` at the # prompt. This terminates the connection and closes the PuTTY window. Then go back into Firefox's Connection Settings dialog box and change the Proxy Type back to Direct Connection To The Internet.

If you find yourself doing this a lot, you can streamline the proxy swapping process in Firefox with a free add-on called FoxyProxy (foxyproxy.mozdev.org). FoxyProxy lets you configure and instantly switch between different proxy servers (and enable DNS requests through the SOCKS proxy instead of the local server without having to use `about:config`) via the Firefox status bar or the menus. ▲

by Warren Ernst



The Bleeding Edge Of Software

Inside The World Of Betas

Apple Safari 3.0.4 Beta



Official Product Name: Safari
Version # Previewed: 3.0.4 beta
Publisher: Apple
Developer and URL: Apple, www.apple.com
ETA: Q2 2008
Why You Should Care: Yet another combatant in the Browser Wars, backed by a strong company.

The Safari 2 beta was all but unusable with Windows, but Safari 3 is a whole different animal. In our subjective testing, it never crashed and it was about as fast as Opera, which is generally regarded as the fastest Web browser. It also consumed far more RAM; at some point, it took up 101MB of memory with only three tabs open, while Firefox 2 used less than half of that with 15 tabs open. Let's hope there's some debugging code running in there.

One of the highly touted features of Apple's OS X has been the inclusion of yet another Web browser: Safari. Safari's claims to fame have been rendering speed, interface attractiveness, and relative browser safety through obscurity (overall, it isn't a very popular browser compared to IE and Firefox). That said, it has been up to now a Macintosh-only club, but Apple is setting to change that with the latest Safari beta.

But why use it? Other than being pretty fast, it's, well, pretty, with Apple's brushed aluminum motif. The various widgets are OS X-like, too, so it fits in with an Apple-themed Windows Desktop. It has a built-in RSS reader, Snapback, pop-up blocking, and iTunes Playlist-like bookmarks. If you've wondered how you're supposed to leave a meaningful comment on a Web site with a teeny-tiny comment field, Safari lets you stretch it to whatever size you want.

Of course, Safari 3 for Windows is handy for Windows-based Web developers who want to check on multiplatform compatibility. It shares the same rendering engine with Safari for the Mac, so there's no need to buy a Mac just to test how your sites look and work.

Safari 3 for Windows is almost ready for prime time, and it will be interesting to see if it ever gets out of the "niche browser" status in Windows. ▲

by Warren Ernst

IBM Lotus Symphony Beta 2

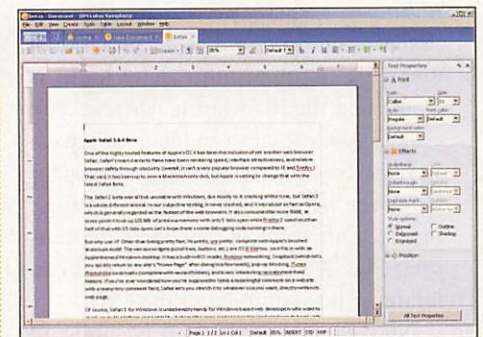
While other software vendors are retiring classic product names (AppleWorks anyone?), IBM is bringing back a name long relegated to the dustbin of history: Lotus Symphony. Symphony was originally a DOS-based productivity suite, combining spreadsheet, word processor, database, data graphing, and telecommunications into one application that resided entirely within 640K.

Needless to say, the new Symphony is a different product, and it has surprising origins. Symphony is currently based on an OpenOffice 1.X code base, which explains its general wonky-ness, but by the time Symphony is eventually released (supposedly early 2008), it will be based on the current OpenOffice code base. The GUI should remain the same, and it's different enough from OpenOffice that many users may prefer it. Like its historical namesake, Symphony works within

one large screen, where different documents, presentations, spreadsheets, and Web sites all appear within their own tabs. There's no more database, and a Web browser takes the place of a modem-based telecommunications program, but Symphony's basic ideas remain the same.

Beyond the main window, IBM has changed OpenOffice's interface of smaller details, too. Instead of a fat row of buttons above the active document and below the pull-down menus, a horizontal palette of options lays along the right edge of the screen. The menus have been rearranged somewhat, and they'll probably make more sense to an average PC user than OpenOffice's sometimes quirky arrangement.

Still, there are three big strikes against Symphony for now. First and second, it is amazingly slow and bloated. Third, you start to notice the wide breadth of features OpenOffice 2 has when you see them



Official Product Name: Lotus Symphony
Version # Previewed: Beta 2
Publisher: IBM
Developer and URL: IBM, www.ibm.com
ETA: Q2 32008
Why You Should Care: Free competition for Microsoft Office is always a good thing.

lacking in Symphony; being unable to open Office 2007 native files is a problem, too.

Still, Symphony shows enough promise to be worth watching in 2008. ▲

by Warren Ernst

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UP TO

Upgrades That'll Keep You Humming Along

Gamers can delight this month in new versions of the Xfire console, the PS3 interface, and the XNA game development platform. Meanwhile, virus hunters get more power out of Panda and the free version of AVG.



Xfire 1.84

The messaging client for running in and around PC games now lets multiplayer members create their own public or private forums associated with an in-game clan or guild. Xfire In-Game 2.0 console now works in Direct3D 10 titles. You can now create chat rooms and invite people to them from Xfire In-Game 2.0.

www.xfire.com

Zune 2.1

The latest player/store/sync software from Microsoft supports the new generation of Zune media players. There is a whole new interface here, as well as improved customization and podcasting support.

www.zune.net

Driver Bay

ATI Catalyst 7.11

This iterative update to the recent 7.10 suite seems aimed at bug fixes, especially game glitches involving Bioshock, Call of Juarez, Hellgate in Vista, and Quake Wars in Windows XP.

www.ati.com

K-Lite Mega Codec Pack 3.5.7

The latest bundle of audio and video codecs for PCs, this version updates fshow to revision 1627 and fixes playback of .APE files. The Haali Media Splitter is updated to the latest version, and Monkey's Audio source filter is added to the mix.

www.codecguide.com

PS3 2.0/2.01 Firmware

The major revision of the PS3 interface was quickly followed by a bug fix. The new features include customization of the XMB navigation interface and the ability to create playlists. An Information Bar optionally runs as a crawl on the main screen with update headlines. A host of new settings and options have been added to this long-awaited refresh of the PS3 interface.

www.us.playstation.com

by Steve Smith

Software Updates

AI RoboForm 6.9.84

The venerable form filler and password vault for Webizens now supports Netscape 9.0 and the alpha version of Firefox 3.

There are several fixes here to the Print List font sizing, the AutoLogoff on Standby mode, and handling of multipage menus.

www.roboform.com

Any DVD HD 6.2.0.1

The DVD decryptor for standard and HD DVDs/BDs gets a new installer and new support for all MKBv4 titles. It handles BD titles better and works more efficiently with PowerDVD player software.

www.slysoft.com

AVG Anti-Virus Free 7.5.503a1205

The very popular free security software now has an option to shut down the computer automatically once a scan is complete. There have been some GUI changes and better window displays in Vista. The virus profile updating procedure has been revised.

www.grisoft.com

DivX Web Player for Windows 1.4 Beta 2

This version now supports Windows Vista for playing back DivX videos embedded in browser pages. It improves media caching, A/V sync, stuttering in video, and overall stability.

www.divx.com

FileZilla v3 for Windows 3.0.4 RC1

The popular FTP client implements proxy support in this release. It fixes a bug when deleting files from very large directories and improves compatibility with VMS and

z/VM servers. FileZilla also now keeps the FTP running when connecting to improperly configured servers. Windows, Linux, and Mac versions are available, as well.

filezilla-project.org

Microsoft XNA Game Studio Express 2.0 Beta

The development kit and library set that lets anyone create cross-platform Windows/Xbox 360 games improves its overall performance and expands support for Visual Studio 2005. It now gets multiplayer and networking support, as well as easier Xbox 360 connectivity. It also now includes an XNA Game Studio Device Center.

www.microsoft.com

Nero 8 Ultra Edition 8.1.1.4

This refresh for the newly released multimedia suite from Nero has unspecified updates and fixes. The Version 8 upgrade to Nero has revamped the interface and the integration of components.

www.nero.com

Paint.NET 3.20 Beta 1

The open-source imaging software has improved overall performance in this release. Problematic plug-ins have been blocked from loading. Fixes to tool and configuration windows and errant button behavior have been applied, as well.

www.getpaint.net

Panda Antivirus 2008 3.01 Beta

The security software optimized its anti-virus performance and now covers system processes in its detection coverage. Installation is improved, as well.

www.pandasoftware.com

The Real Clone Wars

Backup Software Showdown

Nobody who's used a PC for any length of time needs a lecture on the virtues of backup software. It's simply not an option, especially in these days of enormous drives where hundreds of gigs of data constantly spin toward oblivion. With backup software, the question isn't why, it's which one.

We tested a number of backup programs to answer that question, but only the best are highlighted here. Several contenders were dropped because they had bad interfaces or few options, but everything you see here either does one thing perfectly or a number of things really well. Either way, you're sure to find a mix of software that meets your unique needs. The following reviews are split between software that backs up data to local media and services that let you back up files online, as we still haven't found a package that does both for a reasonable price.

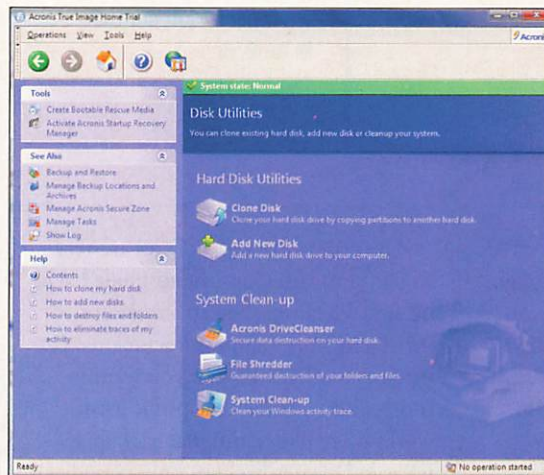
Local Backups

No matter what, you need local backups. It doesn't matter if you save files to optical media, thumb drives, or extra hard drives—just save them and save them often, using the automated features found in the following packages.

Acronis True Image 11 Home

When most people think about backup software, they visualize something like True Image. This software does just about everything, from backing up individual files or folders to imaging entire drives to make disaster recover as easy as possible.

The slick interface makes it easy to access all of the options, which is a good thing because True Image gives power users a lot of control. You can establish exclusion rules to ignore certain file types during backup, and a Pre/Post Commands option lets you roll up your sleeves and apply any commands you like before and



True Image is among the most full-featured backup products available and comes with far more than simple backup tools.

Acronis True Image

11 Home

\$49.99

www.acronis.com



after the backup process. Compression and encryption settings are fully customizable, as are performance settings, so you can tweak the software to perform background backups that won't steal too many resources from your other apps. Automatic disc spanning makes it easy to archive drives to any number of CDs or DVDs, and restoration from any media is a snap.

Good as the backup utilities are, True Image has one more trick up its sleeve called Try&Decide that is a tweak-freak's best friend. It's a virtual system that copies your existing Windows install and lets you play around with settings or open potentially dangerous downloads without compromising the PC in any way. Wondering if that patch you just downloaded for an old game is harboring a Trojan? Hit Try&Decide and pop it open to find out. It's a nice little addition that adds even more value to an all-around superb backup suite.

Genie-Soft Genie Backup Manager Home Edition 8.0

Although power users may prefer Acronis True Image, the eighth iteration of Genie Backup Manager Home offers nearly as many options with an arguably superior

user interface. It performs standard backups by letting users set up various backup jobs (which can be fully automated) and now comes with a complete disaster recovery tool that images and restores everything on the PC.

One nice touch is an Auto Exclude setting that automatically prevents backups of system files and other types of files that are unnecessary and tend to clutter up a backup archive. Recycle Bin files, Power Management settings, temp directories, and similar items are all on this list, which is enabled by checking a single box.

Online backups are supported if you opt for one of Genie's plans, which range from \$4.95 per month for 1GB to \$29.95 per month for 16GB. You can also back up to a different online storage account as long as it supports FTP. Multidrive and multidisc spanning is supported for local backups, and the program also supports removable media with its own unique settings page.

There are plenty of options available when setting up a backup job. You can choose to do a full backup, an incremental backup (if a full backup has already been performed), or a mirror backup that perfectly duplicates the source. Mirroring is great if you want to



Genie Backup Manager has a terrific interface and a feature set that is almost as good as that of True Image.

Genie-Soft Genie Backup Manager Home Edition 8.0
\$49.95

www.genie-soft.com



manage all of your data from the source drive. Don't use it for archiving though, because if files are deleted from the source, they will also be deleted from the mirror copy. Compression levels and encryption settings are fully customizable, although 128-bit AES is the only selectable encryption level.

This is straightforward software that is a decent alternative to Acronis True Image. We recommend downloading the trials, testing both to see which interface and feature set you like, and then sticking with the one you prefer for a standard backup and disaster recovery utility.

Yosemite FileKeeper Professional

FileKeeper is an extremely helpful backup app that focuses on constantly protecting important files instead of imaging an entire drive or using other traditional backup methods. Each type of file on the computer, such as zip archives, Office documents, pictures, or email, gets its own separate backup policy and then the software automatically handles all backups.

The general backup policies are very straightforward. Continuous mode backs up files whenever they are created or saved and works best for documents, pictures, and other files that you want to protect immediately. Snapshot mode works more like traditional backup software and creates backups only periodically at intervals you set (the default is every hour). This policy is intended for use with email, databases, and other files that are always open and therefore impossible to back up using Continuous mode.

Basic as the general backup policies are, each file type can be manually tweaked with exclusion rules that let FileKeeper bypass certain files or folders. File retention rules also are available that let you determine how long old versions of files are kept.

If the idea of continuous backup appeals to you and the ability to access multiple versions of saved files is important, FileKeeper is perfect. It offers just enough options without bogging users down in needless details, and most people will be

able to configure it once and then forget it exists until they need to recover a file. This isn't the only backup software you should use, but it makes a terrific complement to traditional imaging or online backup utilities.

Online Backup

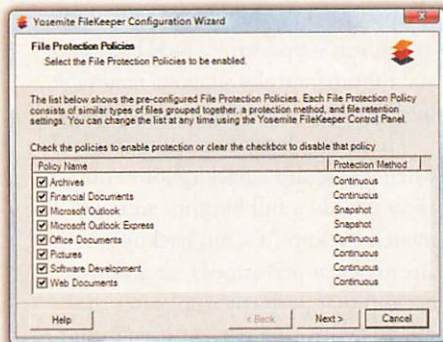
It isn't enough to store files locally anymore. Online storage services provide an additional safety net for a far lower price than was the case in the past, and most are incredibly easy to use. It's too bad none of the standalone clients have merged affordable unlimited online storage into their features, but until that happens, we're sure you'll be happy with one of the following options.

IDrive

In a past article, we rated IBackup (www.ibackup.com) highly for its great interface and features, but the price is a bit steep for home users in search of online backup options. But the company behind IBackup has released IDrive, a sister service that costs only \$4.95 per month and has better overall capabilities than other online backup solutions we tested.

Although IDrive claims the monthly fee buys unlimited online storage, in reality, accounts are capped at 150GB, so forget about putting entire drives on there. If you can live with that limitation, IDrive does something that no other service we tested could do: archiving. Normally when a file is deleted on your PC, accidentally or otherwise, the copy is erased on an online backup server after 30 days or so. IDrive keeps everything on its servers until you manually log in and delete things, meaning you can clear off space on your hard drive and rest assured it will be on your IDrive account when you need it.

IDrive lets you throttle bandwidth usage when uploading but performed much faster during the initial backup than any other service we tested when throttling was disabled. The interface for backing up and restoring is also superb, displaying local directory structures in a left-hand pane and the online account's directory structure in a right-hand pane, and letting you drag and drop between

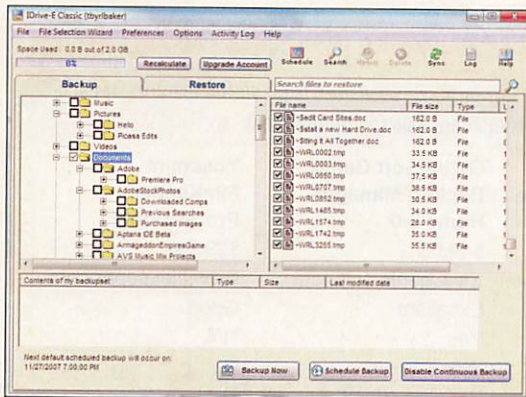


FileKeeper isn't your typical backup software—it continuously saves copies of files you work on and archives the various versions.

Yosemite FileKeeper Professional
\$29.99

www.filekeeper.com





iDrive brings drag-and-drop simplicity to online backup and allows for true archiving.

iDrive
\$4.95 per month
www.idrive.com



This is just one of the three ways you can access your Elephant Drive storage.

Elephant Drive Home Edition
Free for 1GB; \$9.95 per month or \$99.95 per year for unlimited storage
www.elephantdrive.com



the two just as you would with Windows Explorer. An alternative interface is also available that lets you map the online drive to your computer, using it just as you would any other network drive.

The only thing holding iDrive back from a perfect rating is a glitch we experienced while upgrading the client software to the latest version. This requires uninstalling the previous version, which led to an error that required wiping everything related to iDrive from the PC and reinstalling the client from scratch, losing our settings in the process. This kink didn't happen on a separate test system, and the clients worked well on both PCs once they were properly installed and configured, but a more streamlined upgrade strategy would be ideal. Be sure to give the free 2GB service a whirl to see if you like the interface as much as we did.

Elephant Drive Home Edition

Elephant Drive may cost more than the other online services profiled in this

article, but it has one major feature those competitors lack—a Web-based interface that lets you access your backed-up files from any PC connected to the Internet. In fact, you can share any files you like with other Internet users while locking down your private files.

In other respects, Elephant Drive works a lot like Mozy and iDrive. The service offers unlimited storage space, and client software installed locally is available if you don't want to use the

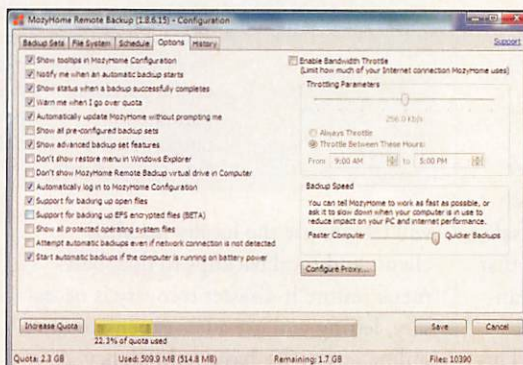
Web interface. A mapped drive option was also in beta at the time of testing, letting users access the service just as they would a networked drive.

The client has plenty of options. You can flag anything from entire drives to particular file extensions for backup, and the software offers complete control over scheduling. It's nice to see such a feature-rich online backup service available at such a reasonable cost for unlimited storage, but bear in mind that the Home Edition has a maximum 1GB file size and restricts monthly transfers (both ways) to 100GB per month.

Mozy Online Backup

Mozy is by far the easiest and least intrusive online backup service we tested but still has enough features to appeal to power users. The initial upload can take anywhere from hours to weeks, depending on the size and number of files being uploaded, but incremental backups that contain only the portions of files that have changed are used thereafter, dramatically boosting performance.

The client uses a tabbed interface that makes configuration and data restoration very simple. It's possible to throttle bandwidth usage, which is really nice during the initial backup, and you can go so far as to tell the client to restrict bandwidth usage during specific hours of the day. There are numerous scheduling options, and 448-bit Blowfish encryption is used to lock down files before they are securely transferred to Mozy's servers. Once there, you can restore files using either the client or a streamlined Web interface.



Mozy is easier to use than nearly all other online backup services, but there are still plenty of options to play with.

Mozy Online Backup
Free for 2GB; \$4.95 per month for unlimited storage
www.mozy.com



Back Up For Free

Although we prefer to stick with commercial products for backup so technical support is available if necessary, there are a number of great backup utilities that won't cost do-it-yourselfers a cent. Here's a quick rundown of the best.

FileHamster

www.mogware.com/FileHamster

This robust version tracking software works much like FileKeeper and has an interface that makes it look better than most commercial packages.

SyncBack

www.2brightsparks.com

If you want to mirror data between two drives or folders, take a look at the free version of SyncBack. If you need more features, an upgraded version is also available for \$30.

DrivelImage XML

www.runtime.org

Most freeware can't back up files that Windows is currently using, but it's no sweat for this software. It uses VSS (Volume Shadow Services) to create a complete drive image for disaster recovery without requiring you to reboot and saves everything in the versatile XML format. ▲

As for performance, after the initial backup, it's easy to forget that Mozy is installed on the computer at all. Everyone should at least try the free 2GB storage service, and if you like it, unlimited storage is available for only \$4.95 per month per PC.

The Backup Plan

As with many utilities, backup software works best when several types are combined to provide better coverage. At bare minimum, we recommend a traditional backup utility such as Acronis True Image or Genie Backup Manager coupled with secure online storage such as Mozy. If you really want to play it safe, also use a package such as FileKeeper that saves important data as you work, meaning you'll never have to redo the work you did between scheduled backups. This

Backup Software By The Numbers

The programs we reviewed have quite a few options, so we break down the features of each in this chart. Take a look to see which product appeals to you the most. ▲

Standalone Apps	Acronis True Image 11 Home	Genie-Soft Genie Backup Manager Home 8.0	Yosemite FileKeeper Professional
Price	\$49.99	\$49.95	\$29.99
URL	www.acronis.com	www.genie-soft.com	www.filekeeper.com
Interface	Good	Excellent	Good
Low-priority Mode	Yes	Yes	N/A
Imaging	Yes	Yes	No
Disaster Recovery	Yes	Yes	No
Continuous vs. Scheduled	Scheduled	Scheduled	Continuous
Disc/Disk Spanning	Yes	Yes	Yes
Intrusiveness	Minimal	Minimal, after configuration	Minimal
Ease Of Use	Good	Good	Excellent
CPU rating	●●●●●	●●●●●	●●●●●
Comments	This has nearly every feature you could want, along with a good interface	The interface is wonderful, and the features are nearly as good as those of True Image	This is the backup software you want if you work on a lot of important projects where continuous backup is essential
Online Services	IDrive	Elephant Drive Home Edition	Mozy Online Backup
Price	Free for 2GB; \$4.95 per month for 150GB	Free for 1GB; \$9.95 per month or \$99.95 per year for unlimited storage	Free for 2GB; \$4.95 per month for unlimited storage
URL	www.idrive.com	www.elephantdrive.com	www.mozy.com
Interface	Excellent	Good	Excellent
Imaging	No	No	No
Disaster Recovery	No	No	No
Archiving	Yes	Yes	No
Desktop Client	Yes	Yes	Yes
Web Interface	Yes	Yes	Yes
Upload Speed	Excellent	Good	Poor
Personal Encryption Keys	Yes	Yes	Yes
Intrusiveness	Minimal	Minimal	Virtually nil
Ease Of Use	Good	Good	Excellent
CPU rating	●●●●●	●●●●●	●●●●●
Comments	Two great interfaces to choose from, and it's one of the few online services that doesn't purge deleted files every month	Mapped drive, Web-based, and local client interfaces make this versatile, as does the unlimited online storage	Truly unlimited storage and very easy to use, but throttled upload speeds make the initial backup tedious

will let you use the locally installed clients and local backups to do a bare-metal restore if disaster recovery is necessary, letting you use a less expensive online service for basic redundancy. A

backup plan is nice, but a backup plan for your backup plan is even better. ▲

by Tracy Baker

I'm InTouch Remote Access Software 6.0

There are a variety of remote access services available, but not many services are offered for less than I'm InTouch Remote Access Software's \$10 per month. And we found that I'm InTouch offers many of the features included in more costly remote access software, including control of pocket PC devices, the ability to share your Desktop with up to 10 people for remote presentations, stealth mode operation, and Web cam access.

Like most other remote access software, you don't have to register your IP address or delve through your LAN settings to set up the I'm InTouch client. Instead, configuration consists of creating a computer name, login name, and password. To remotely access your always-on PC, open your Internet browser (either from another PC or a mobile phone), visit locator.01comm.com, type the appropriate computer name, and then enter the login name and password. For security, the login name and

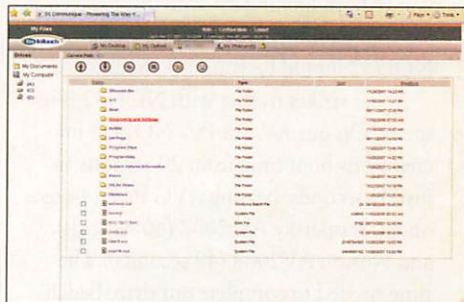
password are only stored on the remote PC and behind SSL 128-bit encryption.

The I'm InTouch Web applet offers convenient My Desktop, My Outlook, My Files, and My Webcam(s) buttons to let you quickly perform specific tasks on your remote PC. The My Outlook feature offers a Web mail interface that's nearly identical to your Outlook or Outlook Express interface, and you can configure the I'm InTouch client to notify you of new emails. The My Files feature took a little getting used to, but we liked the drag-and-drop functionality. The My Desktop feature allows you to view your Desktop in 8-bit color for slower data connections or up to 32-bit color, ideal for remote presentations. In our tests, there was a little lag with graphics-intensive applications, but nothing that would significantly slow down your remote viewing.

You can also configure I'm InTouch to work in stealth mode, so you can monitor

activity on the computer without any indication on the remote PC. I'm InTouch is available in a Standard version—\$5 a month for access only from mobile devices—or a Deluxe version for access from PCs and mobile phones. ▲

by Nathan Lake



I'm InTouch Remote Access Software 6.0
\$10 per month or \$100 for one year (one PC)
01 Communique
www.imintouch.net



Alpha Five Version 8

Have you ever wanted to build your own database with user-defined functions or write a database application for your Web site but didn't have the programming knowledge to make it happen? Alpha Five Version 8 features genies (wizard-like selection processes) that let you create custom database applications without writing any code. And for those of you blessed with programming skills, Alpha Five lets you create custom program scripts in the XBasic language to let you add other functions into Alpha Five databases.

When Alpha Five opens, the application offers several genies to get you started, including genies to import your data from Microsoft Excel or Microsoft Access, to enter data into a premade template, or to create your own new database. Once you get your database set up, you can control the data with several field rules, including validations, conditional expressions, and custom input masks. There are enough templates and adjustable settings to create

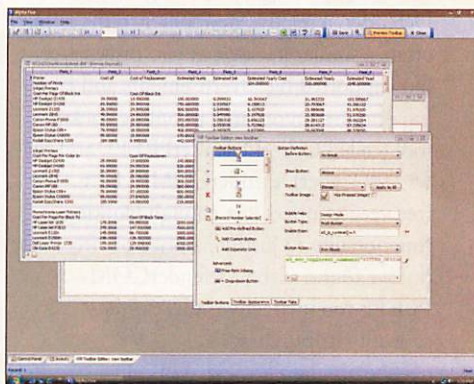
professional-looking databases for both small business and Web designers.

If you regularly deal with large databases, you'll appreciate the Query Genie, which lets you create search criteria from a series of drop-down menus. For instance, we created a catalog of the songs on our computer, and the Query Genie made it easy for other users to narrow down the list. For viewing convenience, you can add custom toolbars, menus, and help buttons, among other options. Alpha Five Version 8 also provides plenty of ways for you to transfer data into reports, form letters, and labels. You can access a Web Projects Control Panel to design a custom database for your Web site.

If you're serious about the appearance and usability of your database information, Alpha Five Version 8 offers you plenty of tools to create the application you need. It took us a little while to get used to the program, but Alpha Software provides excellent tutorials on the Web site, so you can always go online for some quick lessons.

You can download a free 30-day trial to evaluate Alpha Five Version 8, and the application is offered in Desktop, Professional, and Enterprise versions. ▲

by Nathan Lake



Alpha Five Version 8
\$199.99 for the Desktop version,
\$249.99 for the Professional version
Alpha Software
www.alphasoftware.com



ESET NOD32 Antivirus 3.0

Though big companies such as Symantec and McAfee get all the antivirus media love, there are plenty of products from smaller companies that are just as good, and by some measurements, even better. NOD32 has developed a reputation among techies to provide excellent protection yet provide fast performance, and we agree. If you've been looking for antivirus protection for your gaming rig or a slower machine, NOD32 should be your top choice.

What strikes us first with NOD32 is its speed. On our AV test PC, NOD32 increased its boot time from 29 seconds to just 31 seconds, beating AVG Free (44 seconds), Kaspersky AV 2007 (40 seconds), and Norton AV2008 (49 seconds). The time needed to complete our drive benchmark increased just 14%, beating all comers, as well, and it handles spyware and rootkits, too. RAM consumption, however, is high, averaging at around 28MB.

NOD32's interface is a model of simplicity by default, but enabling Advanced Mode provides access to all the advanced goodies a techie would want. Basic Mode provides access to manual virus definition updates (though it automatically checks for them hourly), initiating a manual scan, and temporarily disabling protection. Advanced Mode opens up pull-down menus and more options, such as enabling or disabling email and/or Web protection, setting up scheduled activities, or viewing the quarantined files and checking the activity logs. A super-detailed advanced configuration tree lets you exclude certain folders or file types, change the Microsoft Outlook integration options, or even password protect NOD32's configuration.

As with Kaspersky and NAV, NOD32 scored a perfect 100% in our virus zoo, and independent testing shows it to consistently score in the top, as well. We experienced no false-positives, either.

The "value equation" is tough to judge. NOD32, by design, isn't as feature-filled as NAV, for example, and costs the same initially (\$39.99) and more annually (\$27.99). However, if you put a premium on high speed and high detection rates, NOD32 is well worth the price. ▲

by Warren Ernst



NOD32 AntiVirus 3.0

\$39.99

ESET

www.eset.com



CyberDefenderCOMPLETE

The \$60 price for a computer security suite is fairly common, with Symantec, McAfee, Kaspersky, and ESET all offering comprehensive products which (usually) combine forms of antivirus, antispyware, firewall, antispam, and antiphishing, all in one fairly integrated package. CyberDefender, a relative newcomer to the field, offers a similar package at two prices: free, but supported by advertisements and lacking phone support and an online backup tool (called CyberDefenderFREE), and the \$59.99 CyberDefenderCOMPLETE. The free version offers just enough working functionality to justify its price of "free," but we found CyberDefenderCOMPLETE too ineffective at its primary tasks to justify its purchase.

The program is divided into five modules, each with a tab within CDC's attractive interface. earlySPY, the first, is a spyware blocker, and it has usability problems. By default, it scans for spyware upon every boot, increasing boot time from 29 seconds to 2:16 (minutes/seconds). When

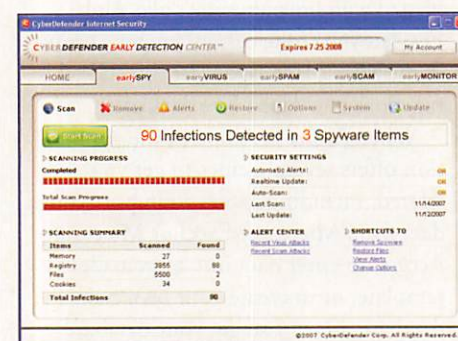
it finds something, it displays a popup proclaiming Spyware Found! with two buttons: Remove Now, and Remove Later. There's no description of what the problem is, and no guidance offered, so the user is choosing actions blindly. But earlySPY is prone to false positives, identifying Microsoft's own Process Explorer tool as spyware. It detects when new programs set themselves to start with your PC, but it flagged the automatic file backup utility as a potential threat, which is bad; "integrated" software should talk to each other.

The other modules have similar mis-cues. earlyVIRUS allowed all sorts of even old viruses (such as the Bagel worm) to write themselves to a PC where other products detected and deleted them. There is no way to right-click a file to do a virus "spot-check." You must run a whole system scan or none at all. earlySPAM only works within Outlook, and it doesn't block spam: It merely blocks attachments. earlySCAM is an antiphishing browser toolbar, but it missed obvious phishing

sites. earlyMonitor checks for a working firewall and an enabled Windows Update, but it claimed a Web browser setting to remember login passwords is a security hazard, which it isn't.

CyberDefender has the potential for greatness but isn't close to that point yet. We'll recommend the free version only for "better-than-nothing" protection. ▲

by Warren Ernst



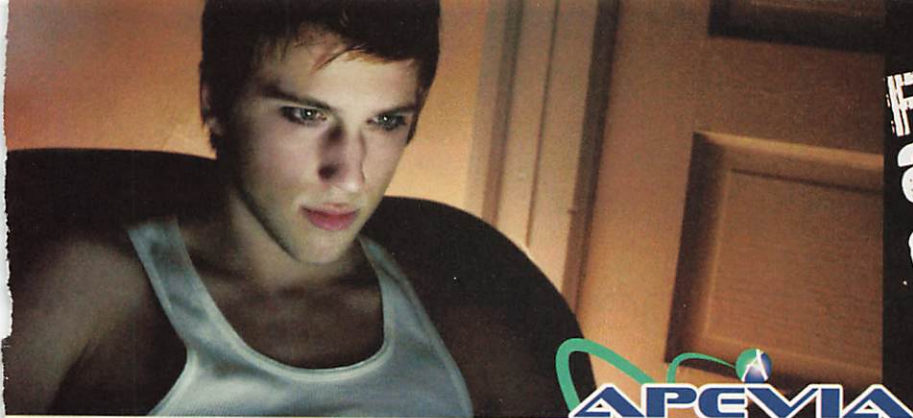
CyberDefenderCOMPLETE

\$59.99

CyberDefender

www.cyberdefender.com





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WWW.APEVIA.COM TO FIND YOUR STYLES

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Best cooling tool-free
extended aluminum
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Fully loaded aluminum
full tower case w/
refined LCD shows
output voltages, sound
volume, fan speed, and
more...



X-Telstar



X-Qpack2

Perfect choice and best
cooling for compact
portable aluminum
case w/ 500W PSU and
a strong durable
handle for grab-and-go.



X-Qpack2
(Special Edition)



Iceberg Power 680W

Most magnificent
see-through 680W
power supply with color
sleeves and adjustable
LED lights - blue, green
and red.



Iceberg Power 680W



X-Cruiser

Thermally advantaged
chassis w/ 3 gauge for
fan speed, temperature
and volume sensitivity
controller more...



X-Cruiser

Dialogue Box

by Chris Pirillo

Macs Save Time, Money, Frustration

When I was first approached to become a founding contributor for *CPU*, I couldn't wait to begin. Since I've always been somewhat of a software and Internet addict, the editors thought it would be wise if I spent most of my time sharing digital discoveries and revelations.

I've been living largely with Microsoft Windows for well over a decade, which isn't quite the same as "living large" with it, mind you. Over the past few months, my industry perspectives have started to straddle the fence, placing me smack dab in the middle of this virtual Venn diagram. My attention is torn between Windows, OS X, and the Web.

I believe I'm not alone here. We're all in search of software that saves us time, money, and frustration. To me, Mac OS X has done it all in ways that I can't easily find in any other OS. I'm not an Apple "fanboi," though I'm certain to be labeled as one. Nevertheless, you need to understand why I've quickly become a Mac power user.

It is unabashed folly to consider Mac OS X a more secure operating system merely because it falls victim to infinitely fewer viruses than Windows does. Indeed, more exploits will be uncovered as Apple gains desktop market share. You'd be wise to put the open-source ClamXav virus scanner (clamxav.com) in your Applications folder.

And what of spyware on the Mac? When I first switched to OS X, I wondered why I couldn't find any usable outbound Internet connection monitoring utilities. It turns out I was just waiting for Little Snitch 2 (obdev.com) to be developed and released. This is beyond a firewall: It's an amazing network monitor for novices and experts alike. Little Snitch further enables you to apply port-level restrictions on any program, with DNS rules and IPv6 support to boot. Moreover, its design puts every Windows security tool interface to shame.

On the subject of security, one of the first things I purchased for my MacBook Pro was a LoJack for Laptops (www.lojackforlaptops.com) subscription. Then, one of you told me about Undercover (www.orbicule.com),

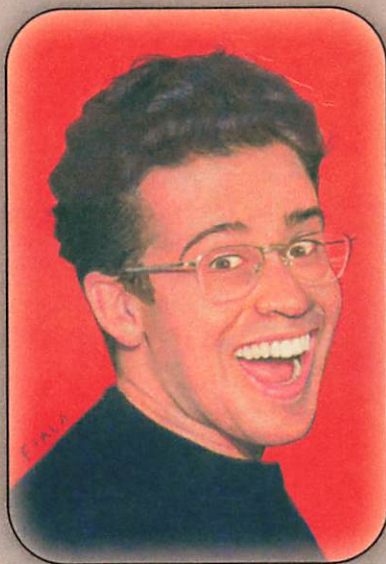
a lifetime laptop protection plan for \$49. Get this: After activating this service for your Mac, if you report the hardware as missing, Undercover will send screenshots of activity to you at regular intervals, snap photos of the thief every six minutes, and ultimately fake a total hardware failure. If the thief takes it in for repair, it will flash a "Please return to owner" message to a tech working on the Mac.

So, we've potentially saved ourselves money and frustration. What

about time? Many Windows power users have long been addicted to the power of ActiveWords (activewords.com). It's a text-driven macro launcher that accelerates your most common routines. With a couple of preconfigured keystrokes, you can have similar functionality in OS X with TextExpander (smileonmymac.com). Even with a vastly better UI and general user experience, TextExpander is still more affordable than ActiveWords. With either one, you can set a typed string of text to produce a result. Entering something like "ttime" would erase the "ttime" and replace it with the system's current time. You'll be addicted to its efficiency in minutes.

Although Leopard's Spotlight was a massive improvement over Tiger's, Mac power users have found continued salvation in the recently open-sourced QuickSilver on-demand command launcher (blacktree.com). It's neither a desktop search app or program manager. It's both, and a whole lot more. Think of it as a tool to help you circumvent otherwise cumbersome processes when it comes to doing things in OS X. "Act without doing" is QuickSilver's mantra, and it's quite valid. I've had some Windows advocates claim that Launchy (launchy.net) is a QuickSilver equivalent, but they're sadly mistaken. There is no QuickSilver equivalent; it's that good.

I've long asserted that cost is relative, but there's also a "lost opportunity" cost at play when it comes to your selected platform(s) for productivity. Are you going to wait forever to find something that may already exist for another operating system? ▲



Chris Pirillo is online right now. You probably just saw him streaming live video from his home office in Seattle, Wash., at live.pirillo.com. If not, you can find him on YouTube, where he's uploading five new tech videos every weekday. There's also his personal blog at chris.pirillo.com, his blog network at lockergnome.com, his conference series at gnomedex.com, and his search tool at taggag.com. His happiness is found in a cup of Peet's coffee every day. If you scratch and sniff this byline, you'll either smell the aroma of Major Dickason's Blend as made in a French press . . . or you'll look really stupid scratching and subsequently sniffing a magazine for self-proclaimed geeks. Either way, Chris is laughing at the thought of you doing it (even if you actually don't).

You can dialogue with Chris at
chris@cpumag.com.

Ubuntu: Not Perfect, But Better Than Vista

I finally upgraded crusty and rusty (but still trusty) SUSE Linux 10.0 desktop to Ubuntu 7.10, aka Gutsy Gibbon (www.ubuntu.com). Ubuntu may not be perfect, but it's better than wrestling with Vista. I'll hit the high (and low) points of my Ubuntu experience, and you can judge for yourself.

Synaptic Package Manager. Synaptic lets you install every piece of software you could possibly want (23,000 or so at last count).

It's an easy-to-use front end for endless free/open software, as well as popular non-"free" software (e.g., Real Player).

Update Manager. When software updates are ready, a little star shows up in your taskbar; you choose which packages to upgrade. (And you can upgrade whenever you want.) Does Windows still require rebooting every time you change a configuration or install a new driver? Because Linux still doesn't. You can even upgrade a running application, although you'll be reminded to restart for changes to take effect.

Choices. Sometimes the defaults just aren't that great. Ubuntu's default window manager is GNOME, which is alright for some things. But GNOME's clipboard tool, Glipper, only gave me fragments of clipboard selections; I switched to Klipper from KDE and liked it much better.

Compiz. Awesome GUI whiz-bangery, similar to Vista's Aero, but without requiring high-end hardware. I was able to run it on two older systems—one with an old Nvidia card and another with integrated graphics.

Googlizer. Do you Google? Stick Googlizer on your app bar and highlight text anywhere in *any* window. Click the Googlizer "G," and a separate tab bearing the Google search results pops up in your Web browser. One highlight, one click. How cool is that? Where's Googlizer for Windows?

Tomboy. I fell in love with this wiki-style note-taking app after using it for about an hour when I tried Ubuntu last year. My first thought was, "This is just another goofy little notepad," but then I tried it. It's simple, easy to use, and makes writing lists and taking notes incredibly easy. Many handy plugins make it even handier. By the way, as one

of the few default Ubuntu apps, Tomboy apparently has more fans than just me.

Fewer bugs. I tend to work around bugs, a habit I acquired when I used Windows, actually. It's easier to avoid them than to get Microsoft to fix them. I can usually Google for easy answers on the Internet, but if not, it's still usually easier to leave things alone until the next release. Gutsy Gibbon brought much relief from Open-

Office's buggy URL-handling to Evolution's odd crashes. Software upgrades should have fewer bugs, right?

New features. I needed to think this one over; an upgrade isn't an upgrade without new features and functions, right? Gutsy Gibbon claims better hardware support (it's true: I used to have problems getting audio running with prior Ubuntu versions), improved video support (including multiple monitors), Windows compatibility (including read/write access to NTFS partitions), 3D screen effects and other cool UI stuff, desktop search, and automated and validated Firefox plug-in installation.

Easier non-"free" software. Through Synaptic, Ubuntu now simplifies getting non-"free" software. For example, now you can easily get applications such as non-open media players for your MP3s, WMVs, and other proprietary formats.

Latest and greatest. Gutsy Gibbon includes upgrades for almost all the software on your system—GIMP 2.4, OpenOffice 2.3, GNOME 2.20, Evolution 2.12, Firefox 2.0.0.6, and much more; security patches and upgrades area also breathtakingly easy via Update Manager.

What's not to like? Not too much, but I would like an easy way to migrate user data from one distribution to another. Also, while I wouldn't call Ubuntu (or OpenOffice or Evolution) bloated, it initially seemed awfully poky on my 64-bit AMD PC. However, after tinkering with my configuration and downloading a software update, the sluggishness magically disappeared—all without waiting a year for a service pack. ▲



Pete Loshin publishes LinuxCookbook.com, a place to learn even more about Linux. And don't forget to check out the new Ninitata.com, Pete's family-friendly fun and learning site.

You can get saucy with Pete at pete@cpumag.com.

Cable vs. DSL

The Debate Rages On

There are some fundamental disagreements in America that go to the heart of who we are as a people: Democrat or Republican, creationism or evolution, cable or DSL. The two main options for high-speed Internet access continue to run neck and neck for dominance in the market as U.S. Internet penetration seems to be approaching its peak at between 66 and 70% of households,

had only 17 million subscribers in 2005 vs. cable's 26 million, clearly enjoys the fastest growth. Nevertheless, Comcast claims that it now gets the majority of its new Internet customers from the ranks of disenchanted DSL users. As the two technologies now rival one another in speed, coverage, and popularity, users now have a choice and clearly are taking advantage of the options.

technology has its defenders and detractors, and service, speed, and pricing can vary widely from region to region or even block to block in some neighborhoods. While we can't make the ultimate decision of your ISP choice for you, the technologies are advancing quickly enough to merit an occasional revisiting of the great debate and where the providers sit now.

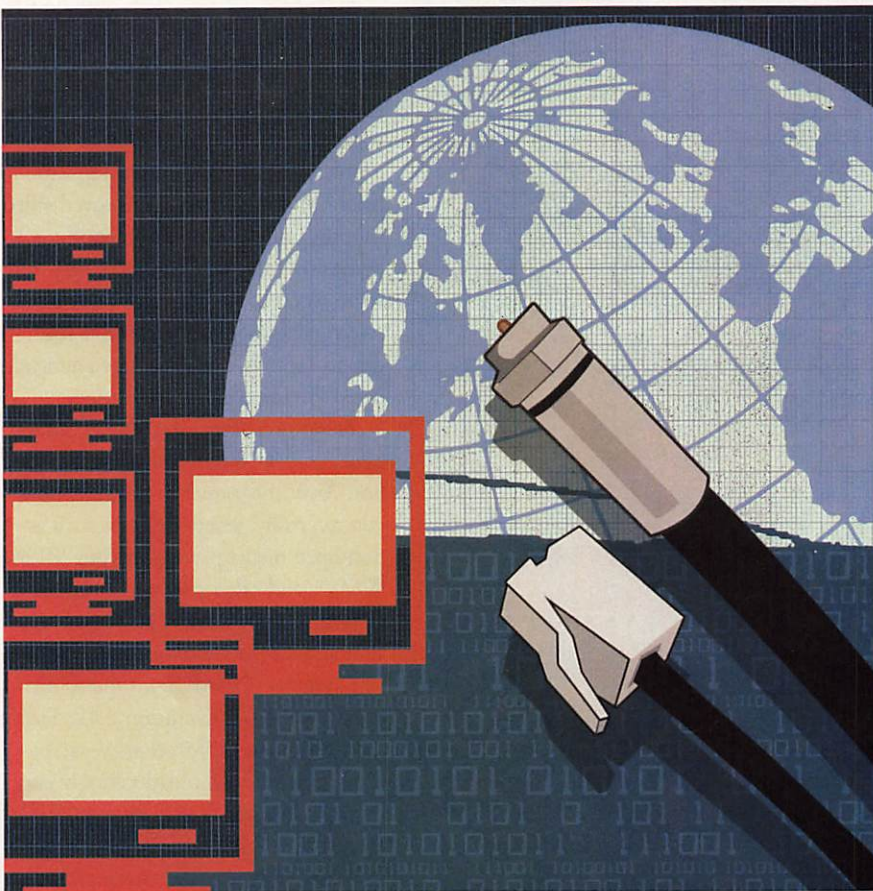
Location, Location, Location

Your location is the first filter for narrowing down choices among broadband technologies. Cable had a considerable head start over DSL in providing high-speed access, and it continues to have the broadest coverage in the U.S., so most neighborhoods with cable TV can also get broadband on the same coaxial cable coming into the house. DSL, however, relies principally on upgrading and reconditioning a copper phone line system that evolved in various states around the country. Location can also determine pricing, and this can vary considerably across the country. Wherever telcos are trying to make inroads with DSL, you'll see ISPs of all sorts cut prices and offer new bundles of services in order to compete.

One of the best ways to discover the options in a given area is to use the databases at DSLReport.com (dslreport.com), where you can enter a ZIP code and see the companies, prices, and technology options in your immediate vicinity.

DSL Pros & Cons

"DSL" is a catch-all phrase for several technologies that include ADSL, SDSL, and VDSL. ADSL, or Asymmetric Digital Subscriber Line, can support download speeds up to 8Mbps and upload speeds up to 1,024Kbps. SDSL, or Symmetric DSL, tends to max out at a rated speed of 1.5Mbps for both downloads and uploads



according to eMarketer. Low-speed dial-up access is now a relic in America, with over 82% of connected homes using some form of broadband.

According to the latest estimates, about 32 million U.S. homes will be wired for DSL by the end of 2008, compared to 38 million with cable modems. DSL, which

But how does a high-speed Internet user decide between DSL and cable? Alas, neither cable nor phone companies attract a lot of love among consumers, so the online discussions are rife with heated arguments, false technical claims, and horror stories about the quality of service from both sides. Each

and, unlike ADSL, requires a dedicated line apart from your voice service. The upcoming VDSL, or "very high bit-rate" DSL, is still being developed but promises downstream connections of over 52Mbps and upstreams of 2.3Mbps.

For entry-level users, one of the advantages of DSL service is its lower, more flexible pricing. While most cable services have one standard \$45 to \$55 service plan and a more expensive high-speed tier, DSL providers such as

AT&T and Verizon have plans that start as low as \$14.95. For example, AT&T offers a 768Kbps downstream service for \$14.95 per month, a 3Mbps speed for \$24.99 per month, and 6Mbps for \$34.99 per month. In some areas of the country, smaller telcos are encouraging DSL expansion with even lower prices and bundles that may include a free PC.

Another key selling point for DSL is that you enjoy dedicated bandwidth across a closed connection. Cable service shares bandwidth with others in a neighborhood. It is a misnomer, however, that DSL is entirely unshared, as at some point, when the individual lines come together at the central office, they are all using a pool of bandwidth. But in the case of DSL, that sharing takes place much higher upstream than cable, so the number and usage levels of people also on the service in your neighborhood should have no effect on your speeds.

This is not to say there aren't great ranges in performance and availability with DSL. Like cable, DSL's stated "up to XXMbps" speeds are theoretical speeds that often bear little resemblance to the actual speeds one gets in a neighborhood. Because DSL is running on an aging phone network that varies in quality, "A lot depends on where you are located," says Stuart Zipper, editor-in-chief of *Broadband Business Report*, a longstanding trade journal for the high-speed access industry. Zipper himself gets 6Mbps DSL service in his Colorado office, but a friend just blocks away cannot get DSL of any kind. "A lot has to do with the age of the

copper in the ground and the switches. Old voice switches were built with filters that actually filter out DSL signals. It can be a matter of different service across neighborhood blocks." Zipper believes that DSL and cable are about at parity when it comes to standard speeds, although DSL real throughput will vary more than cable. Many DSL services do have somewhat lower upstream speeds than cable. Until recently, for instance, Verizon's 1.5Mbps download service had a 128Kbps upstream speed. "The DSL is probably a little better on upload," he says. In order to compete more effectively with cable and to accommodate increased multimedia uploading by users, the company announced last summer it was tripling its upstream speed to 384Kbps.

The primary considerations for getting local and higher-speed service are the general quality of your phone lines and the distance between an end user and the "central office" where the signal originates. The DSL signal degenerates and gets slower as it moves away from the central office. Most providers consider 18,000 the cut-off point for providing DSL to customers. Where you are on the line can affect the top speeds you will achieve.

Cable: The Old Standby

Cable modem broadband access is among the oldest and certainly the most accessible of the various high-speed gateways to the Internet. Unlike DSL, it is not a distance-sensitive technology, so it continues to beat out DSL in terms of consistent coverage. "Cable technology

The Major Players

The choices for high-speed access have mushroomed in recent years as more areas of the country light up with DSL coverage and regional cable companies get increased traction. Comcast (cable) and AT&T (DSL) are the overwhelming national giants in their respective categories, but a number of regional companies such as Charter Cable and Qwest have substantial subscriber bases along with even more localized offerings.

Top 10 Cable & Telco Broadband Providers (U.S., Q2 2007)

Provider (Cable)	Subscriber Base
Comcast	12,380,000
Time Warner	7,188,000
Cox	3,545,000
Charter	2,583,000
Cablevision	2,168,000
Insight	674,900
Mediacom	613,000
Cable One	316,357
RCN	270,000

Provider (DSL/Telco)	Subscriber Base
AT&T	13,253,000
Verizon	7,686,000
Qwest	2,405,000
Embarq	1,156,000
Windstream	752,600
CenturyTel	500,000
Citizens	479,317
Cincinnati Bell	211,800

Source: Leichtman Research Group

Out Of Thin Air: Satellite Broadband

After a few false starts, broadband via satellite got a major boost last year by the emergence of "KA Band" signaling. This new approach focuses the signal more tightly to make more efficient use of available satellite signals. The emerging services from WildBlue (www.wildblue.com) and Hughes (www.hughesnet.com) overcome earlier problems with oversized dishes, poor download and worse upload speeds, and high tech costs. For rural areas where cable and DSL are unavailable, "Satellite is going great guns," says Stuart Zipper, editor-in-chief of *Broadband Business Report*. Still more costly than cable or DSL, services such as WildBlue start at \$49.95 for 512kbps/128Kbps service. Dishes are now much smaller, can handle upload and download tasks, and start at \$300. Upside? These services are available almost anywhere in the U.S. ▲

delivers closer to the promised bandwidth over a greater area," says Zipper. In most regions served by a major cable provider such as Comcast or Time Warner, users can move to different homes within the same region and maintain their ISPs, email accounts, etc., which can be trickier with spottier DSL availability in some areas.

Until recently, cable providers have enjoyed monopoly status in many communities, which is reflected in their pricing. With some exceptions in highly competitive markets, cable-based high-speed Internet is available in only one or two tiers of speed. While it varies according to ISP and region, Comcast, the largest cable provider in the U.S., typically offers a 4Mbps/384Kbps standard service at \$42.95 per month and a bump up to 6Mbps/768Kbps for another \$10. As competition heats up, however, Comcast has started offering what it calls a "PowerBoost" feature. The service detects when a large file is being transferred and claims to throttle the speed up to 12Mbps/2Mbps. Of course, some cable ISPs (Comcast and Cox in particular) have been found to throttle back the speed for customers using BitTorrent peer-to-peer file-sharing protocols. And just as DSL has a super-high-speed VDSL technology slowly emerging, cable is banking on its own common protocol, DOCSIS (Data Over Cable Service Interface Specification), to move to version 3.0 over the next few years. This upgrade of the DOCSIS standard promises to triple current cable bandwidth coming from nodes into the neighborhood.

While cable signals are not distance-sensitive like DSL's are, they too never deliver the theoretical maximum speeds. Cable sends radio frequencies through coaxial cables into the home, and many environmental RF signals encountered along the way can degrade that performance. A greater worry to many customers, and a frequent topic of debate, is the fact that cable ISP customers in a neighborhood actually share bandwidth on the same node. Arguments continue to rage in forums over how much shared usage really affects users. Just as distance

Cable vs. DSL

Cable broadband access is popular in the U.S., but worldwide, DSL is king.

Worldwide Market Share Of Broadband Access Technologies (by end of 2006)

Technology	Number Of Subscribers	% Of Subscribers
DSL	184,934,032	65.7
Cable	62,810,493	22.31
Fiber	29,749,662	10.57
Other	3,213,646	1.14
Satellite	748,750	0.28

Source: Point Topic, 2006

to a local central office affects DSL speed, the number of people in a neighborhood sharing a node, the bandwidth a provider reserves for the node, and neighbors' own usage patterns ultimately can affect cable end-user speed.

Zipper says, "architecturally, cable is more like a local-area network, a ring," where everyone shares bandwidth at the local level. DSL is designed in more of a star configuration, where individual lines come out of a common node but service each home individually. Ultimately, bandwidth is shared in both configurations, but that sharing takes place at different points upstream from the home. Some cable customers in online forums report noticeable drops in cable ISP performance after school hours when kids come home and start their routines of massive downloading. And while cable companies often deny security concerns over their architecture, Zipper insists that the neighborhood network design of cable systems make them more susceptible to security breaches.

So how do ISP shoppers decide for themselves how to resolve this ongoing battle of the high-speed access behemoths? Availability is still the biggest deciding factor for many users. The best place we have found to understand what options are available in a given area is BroadbandReports.com, which is one of the better directories of local service providers and user reviews we have found. The index includes reviews of service

down to the local ZIP code level. When it comes to high-speed access, broadband, like politics, is local. ▲

by Steve Smith

Infinite Loop

Does "Don't Be Evil" Really Apply To World Domination?

We've seen FUD before, but it would take a lot of effort to trump the latest tinfoil-hat, er, "scientific" study from an Austrian university. According to Graz University's Professor Hermann



Maurer, "Google's open aim is to know everything there is to know on Earth. It cannot be tolerated that a private company has that much power: It can extort, control, and dominate the world at will." Maurer was promptly hauled into a windowless van by men in black suits and sunglasses saying "Nothing to see here. Move along."

Source: www.smh.com.au/articles/2007/12/05/1196812806297.html

The Department Of Stuff

by Rob "CmdrTaco" Malda

bloatware.txt

It seems that bloat is something that inevitably arises in everything, from corporations to open-source projects. Thin, sleek startup corporations become slow and bloated with extra layers of management, and that thin bit of code that did one thing well adds more and more features, sucking down more memory, and eventually is replaced with a new generation.

A decade ago, I did a lot of work on window managers under X11. The window manager is the bit of code that draws the borders around your windows. It provides space for you to click to make windows bigger or smaller, or to minimize them or close them. Under X11, this code was a separate little beast and was open game for hackers to modify. Unlike today, where in Vista or OS X you can do only the most basic themes and skin changes, under X11 you can make any change you desire.

In the early days of X11, there was essentially a small group of window managers. From *wm* to *twm* to *fvwm*, these applications shared code, and with each version, they got a little bigger. New features were added, from virtual desktops to flexibility. In the mid '90s, it became fashionable to start from scratch and create new systems such as *WindowMaker* (focused on creating a minimal system) to *Enlightenment* (focused on maximum flexibility). These systems had no choice but to discard the old systems. So many years of being picked at by so many engineers had created bloated, messy systems. Anyone who tried to hack at *AfterStep* or the first developer releases of *Enlightenment* (both based on *fvwm*) knew it was the end of the line.

Today we see another darling of the open-source movement at a crossroads. Firefox spawned from the ashes of Mozilla, a bloated, over-engineered system that suffered from too many cooks in the kitchen. The best part of Mozilla was a standardized Web kit. Transforming HTML into something pretty for you to look at is a tremendously difficult task . . . but the browser had so many other pet projects buried

within it that its memory requirements and performance made it almost useless.

Firefox gutted Mozilla, taking the rendering engine and rewriting only the features necessary to create a good browser: a basic plug-in system, bookmarks, tabs. Within months, the world's most popular open-source browser took off.

But today we can see history repeating itself. Firefox 3 contains a host of new but mostly unnecessary features. Everyone has their own pet projects, and when you have an open-source project, the tendency is to throw in new features because it's fun.

When this goes too far, we'll see a fork, and a new minimal, fast browser will burst forth into popularity. It's unclear what exactly this platform may be, or even if it will share a rendering engine with the Firefox browser, but it's almost inevitable: As an application ages, features are added, system resources are consumed, and someday a rewrite will happen.

This is why startup companies out-innovate the old guard corporations. A dozen motivated coders can create something wonderful out of nothing at an amazing rate. But a decade-old corporation is so filled with middle managers, PowerPoint presentations, financial statements, projections, and marketing that it becomes difficult to create a simple, beautiful thing within any sort of reasonable time frame.

But all of this shows the beauty of open-source software. When a project gets too big for its britches, someone will start over, and like a phoenix bursting out of the ashes, something new and elegant might arise. This stands in stark contrast to monstrosities such as Windows Vista. Each version of Windows consumes more resources, adds less actually useful functionality, and ultimately sells more hardware just to keep up with the irrelevant additions. It's enough to make you want to run an open-source operating system. ▲



Rob "CmdrTaco" Malda is the creator and director of the popular News for Nerds Web site Slashdot.org.

He spends his time fiddling with electronic gizmos, wandering the 'Net, watching anime, and trying to think of clever lies to put in his bio so that he seems cooler than he actually is.

Contact me at malda@cpumag.com

ROAD Warrior

by Jen Edwards

Magellan RoadMate Delivers GPS Navigation On The Cheap

Many GPS navigation systems can help keep you on track, but they can also be relatively bulky. Magellan's entry-level RoadMate 1200 (\$229.99) is designed to pack a lot of features into a small space. The RoadMate 1200 has a 3.5-inch touchscreen display in a pocket-friendly design, measuring 3.63 x 3.30 x .69 inches (HxWxD) and weighing just under 5 ounces. The GPS device is accurate to within 3 to 5 meters, and an internal rechargeable battery provides three hours of power for mobile use. Full maps of the continental United States (including Hawaii and Puerto Rico) and 1.3 million POIs are preloaded on the included SD memory card.

The unit provides full turn-by-turn, voice-guided directions and customizable routing options that let you choose the fastest routing options, avoid toll roads or particular streets, etc. And the Tow Truck icon lets you to get precise information about your current location for roadside assistance in an emergency. The RoadMate 1200 comes with adhesive dash mount and windshield cradle, car power adapter, and users manual. ▲



Magellan's RoadMate 1200 provides accurate GPS navigation in a slender, affordable package.

PC MicroWorks Unleashes New Workhorse Laptop

Desktop replacement notebooks are the best way to take a powerful system with you wherever you go, and PC Micro-Works' Black-Hawk XR5 quad-core notebook is no exception. Featuring the Intel Core 2 Quad Q6700 as an option (the Core 2 Extreme X6800 is also available), 4GB of RAM, a 17-inch HD WUXGA display, and two

Nvidia 8800GTX GPUs with 1GB of dedicated video memory, the Black-Hawk XR5 is powerful enough for even the hungriest graphics and gaming applications.

According to PC Micro-Works, the Black-Hawk is also the first laptop to support three hard drives and can be configured with three 3Gbps SATA

drives of up to 250GB each. PC MicroWorks will also configure the multidrive systems in a RAID 0 or 5. (A RAID 1 setup also works, but you must configure it yourself.)

Other features include a GPS receiver (optional), SPDIF output, four USB ports, one FireWire port, RJ11 and RJ45 connectors, an ExpressCard

slot, and TV-out. Bluetooth and 802.11a/b/g are standard, and EVDO/HSDPA options are available. An optional adapter lets you connect as many as three external monitors, and you can add a TV tuner and remote control. Finally, PC MicroWorks lets you also add a dual-layer BD-RE optical drive for \$939.



Wireless SD Card Lets You Share Pictures Instantly

If you find yourself taking a lot of pictures but never seem to have the time to transfer them to your computer (much less share them with friends and relatives), check out the new Eye-Fi Card, a wireless 2GB SD card. The card works with any digital camera compatible with SD memory cards. After a brief setup, during which you choose how and where to share photos, the Eye-Fi can send uncompressed pictures to 17 different online photo-sharing and social networking sites, including Facebook, Flickr, Kodak Gallery, PhotoBucket, Picasa, SnapFish, and TypePad.

If the online destination has site-specific requirements for photo size, the Eye-Fi upload service handles resizing automatically. Photos are also automatically archived to the user's home PC or Mac computer, in a directory specified during the initial setup process. The Eye-Fi Card is available for \$99. ▲

Forget digital cameras with integrated Wi-Fi. The Eye-Fi brings wireless to the SD card itself.

Asus Gamers Design Awards, Unveils New Products At CES

Four Asus products received International CES Innovations Design and Engineering Awards in advance of the CES 2008. The Eee PC and the previously unannounced R50A UMPC both received honors in the computer hardware category, with the P527 GPS cell phone and Asus Internet Radio winning in receiving awards in the phone and personal electronics categories, respectively.

The R50A has an impressive lineup of features, including a pen-enabled 1,024 x 600 screen, 3/3.5G connectivity for Internet

access (a list of service providers was unavailable at press time), a built-in TV tuner, and an internal GPS receiver that integrates with Google Maps. A Web cam and microphone are also built-in. Asus hadn't released complete specifications at the time of this writing, but the R50A is already shaping up to be a very competitive entry.

The P527 GPS cell phone is designed to be both elegant and functional, with a brushed metal exterior and plenty of power under the hood. Asus claims it has optimized the

internal GPS receiver to provide quick satellite location, and the included Travelog application lets users attach pictures and journal entries to particular points of interest along a route. Users also have the option to share their location with others.

A 2MP camera can take still photos and video and can also be used as a business card scanner. Once it scans a card, the P527 can synchronize the new contact data with Microsoft Outlook. Mobile versions of Word, Excel, and PowerPoint

are also included, and the phone can be used as a remote during PowerPoint presentations. Additional features include 802.11b/g connectivity, push email, and an RSS newsreader.

Finally, Asus' AIR (Asus Internet Radio) connects to the Internet via Wi-Fi to let users listen to over 10,000 Internet radio stations without a computer. With a retro look but modern ecological sensibilities, the AIR only draws 8 watts of power per hour, unlike a desktop's 300 watts or a laptop's 60 watts. ▲

Sony Ericsson Brings Gesture Control To Mobile Phones

The W380 Walkman phone from Sony Ericsson adds a new way to control your mobile handset with Gesture Control, which offers truly hands-free calling. You can mute calls and the phone's alarm with the simple wave of a hand (which makes "hitting" the snooze button for a few extra minutes of shut-eye even easier).

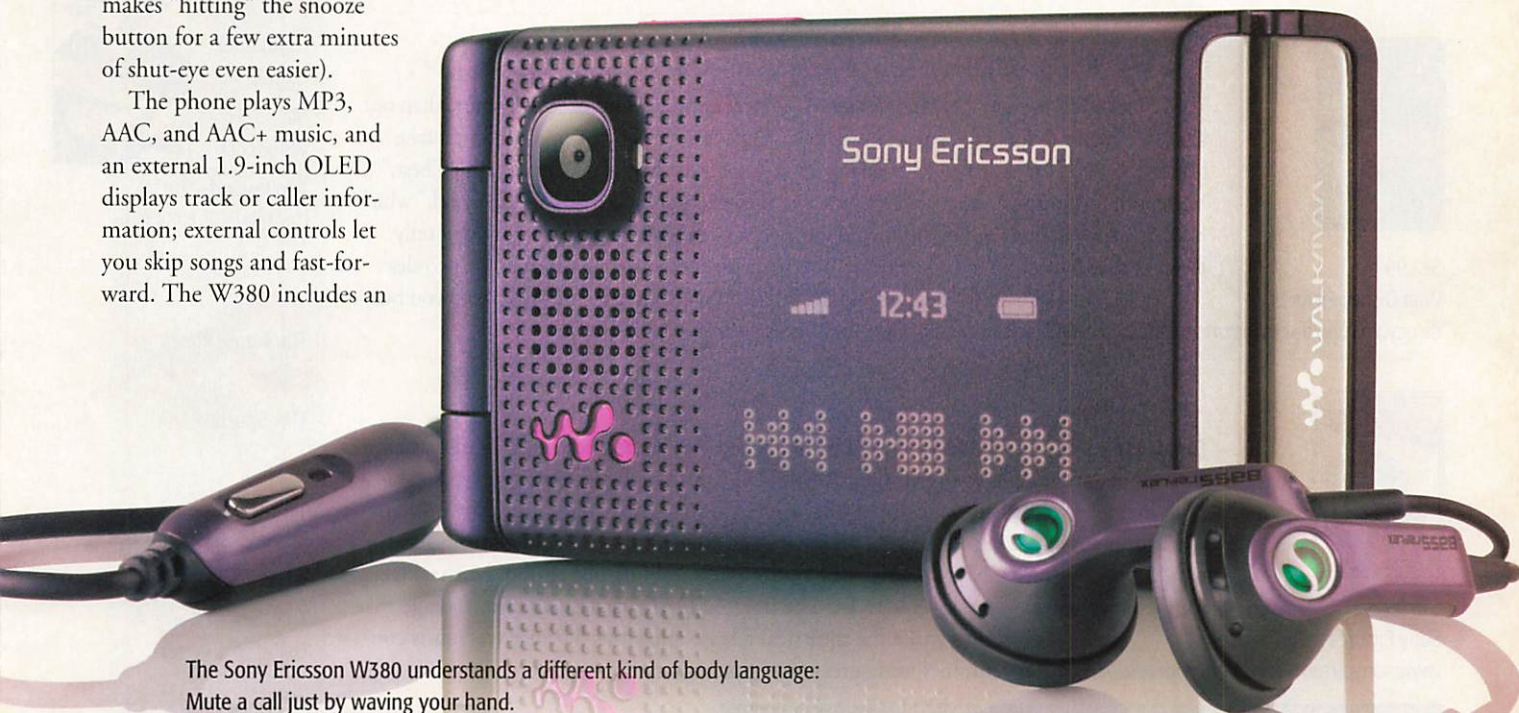
The phone plays MP3, AAC, and AAC+ music, and an external 1.9-inch OLED displays track or caller information; external controls let you skip songs and fast-forward. The W380 includes an

FM radio with RDS, and its TrackID function instantly identifies any song playing on the radio with artist and song title. A 1.3MP camera with 4X digital zoom, USB mass storage capability using the included 512MB M2 Memory Stick,

and PIM applications round out the feature package.

The tri-band GSM W380 comes with a battery, charger, USB cable, stereo portable hands-free headset, and Media Manager PC software. Optional accessories include the new

Sony Ericsson HBH-PV703 Bluetooth headset, MBS-100 Portable Bluetooth Speaker, and HPM-83 Neckband Headset. The phone will be available this quarter in two colors: Electric Purple and Magnetic Grey. ▲



The Sony Ericsson W380 understands a different kind of body language: Mute a call just by waving your hand.

At Your Leisure

The entertainment world, at least where it pertains to technology, morphs, twists, turns, and fires so fast it's hard to keep up. But that's exactly why we love it. For the lowdown on the latest and most interesting releases in PC entertainment, consoles, DVDs, CDs, and just leisure and lifestyle stuff we (for the most part) love and recommend, read on.

Audio Video Corner

by Blaine A. Flamig



\$20.99
Geffen Records
www.rufuswainwright.com

Rufus Wainwright—"Rufus Does Judy At Carnegie Hall"

Rufus Wainwright does many things extremely over-the-top well, including work an audience for all it's worth. Not that the Canadian native really needs to, as his immense talent proves on this 26-track, two-CD set recorded live with a 36-piece orchestra before an adoring, appreciative audience at the infamous New York City Hall. Wainwright recorded the show in June 2006, reproducing track for track the same legendary show the legendary Judy Garland performed in 1961. Songs include such classics as "Puttin' On the Ritz," "Alone Together," "That's Entertainment," and, of course, "Over the Rainbow," which Wainwright triumphantly and emotionally nails. This may be your mother's music, but that doesn't mean anyone can't enjoy the hell out of it.



\$15.99
Virgin Records
www.daftpunk.com

Daft Punk—"Alive 2007"

Concerts that veteran electronic outfit Daft Punk drops on audiences are almost as much about the extracurricular, multimedia theatrics going on as they are about the music itself. Thus, it makes sense that it feels something formidable is missing while listening to "Alive 2007," which Thomas Bangalter and Guy Manuel de Homem-Christo crafted live in June before an adoring hometown audience in Paris. Yet, the record still works terrifically well, especially when played very loudly. Further, Daft Punk packs in multimedia goodness by way of a 50-plus-page booklet, along with other bonus content. From the opening "Robot Rock/Oh Yeah" to the closing "Superheroes/Human After All/Rock 'N Roll," Daft Punk mixes, weaves, and splices together a fantastic galactic journey.



\$22.99
Walt Disney Pictures
disney.go.com/disneypictures/pirates

Pirates of the Caribbean: At World's End

We've looked forward to each installment of Gore Verbinski's "Pirates" trilogy more than our kids, due largely to our anticipation of seeing exactly where Johnny Depp would next take his for-the-ages Jack Sparrow. After falling off slightly in the plodding "Dead Man's Chest," Verbinski, Depp, and crew are back on track in the action-drenched "At World's End," which finds Sparrow dealing with his death and introduces us to Sparrow's daddy, played as only Keith Richards could. Verbinski takes us on a magical, effects-laden journey in the two-disc collector's DVD edition, which is packed with enough treasure to keep you busy until Jack hopefully takes another big-screen ride on the Black Pearl.



\$16.99
Sony Pictures
www.sonypictures.com/homevideo/superbad

Superbad

Jonah Hill, who was viciously wicked in "Knocked Up," is comedic gold in this teenage-themed gem that childhood pals Seth Rogen and Evan Goldberg started writing as kids. Hill, however, gets plenty of competition in the raunchy department from the brilliant Christopher Mintz-Plasse as Fogell/McLovin, and Rogen himself is gut-busting good paired with "Saturday Night Live's" Bill Hader as a bumbling police duo. Michael Cera rounds out the fun as the lovable Evan. The unrated DVD version contains footage that didn't make the theatrical release, plus tons of must-see bonus content, including great cast commentary.

DVD Byte

DVD Byte

1/8

Death Sentence

Dragon Wars

3:10 To Yuma

1/15

Good Luck
ChuckMr.
WoodcockTorchwood—The
Complete First Season

1/22

The Game Plan
Saw IV

This Sporting Life

1/29

Rocket Science
King of California
The King of Kong: A
Fistful of Quarters

See the full reviews from A/V Corner at www.cpumag.com/cpujan08/AYL

CALL OF DUTY[®] 4

MODERN WARFARE[™]

CPU
Game Of The Month

Adrenaline Overload -by Dr. Malaporop

\$49.99 (PC); \$59.99 (360, PS3) • ESRB: (M)ature • Activision • callofduty.com

Infinity Ward's Call of Duty series started out on the PC but morphed into a powerful gaming experience on consoles with the release of CoD2. (The exception was CoD3, which was not developed by Infinity Ward.) As good as the first couple of games were in the face of an overused setting (World War II), the developers set out to re-create the combat intensity synonymous with CoD games in a more modern and perhaps, to some, more relevant setting. Dependable hallmarks of the series return, such as more accurate fire for aiming down a gun barrel, swapping between characters during the course of the 19-level single-player campaign, and heavily scripted missions to build the gripping intensity that is portrayed so well.

As with previous CoD games, you'll be fighting on different fronts, in this case mostly the Middle East and Russia. Of the three characters you play, the two primary ones are Sergeant "Soap" MacTavish of Britain's SAS and Sgt. Paul Jackson of the United States Marine Corps. After the training mission that helps determine your skill level setting, you'll be off on your first mission before the introductory credits roll. Your heart will be pounding as you witness a presidential overthrow in an unnamed Middle Eastern nation—probably one of the most powerful intros we've ever seen in a game. From here, it's one blistering mission after another. Some memorable ones include the emotionally cold AC-130H Spectre Gunship mission and the tense encounter as you play in a ghillie suit. There are far too many encounters to highlight here, but the deadly attack dogs, the ability to shoot through surfaces,

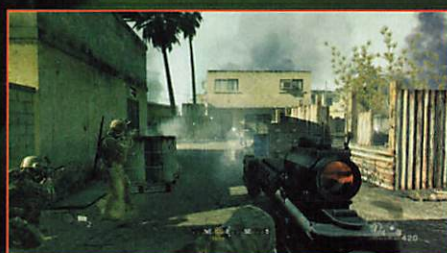
bullet physics, intelligent squad mates, decent enemy AI, spot-on audio and sound effects, and strong storyline all work to make the single-player game tremendously worthwhile.

After you've drained your adrenaline in the single-player mode, it comes time to delve into the multiplayer game, which features 16 maps and persistent, flexible ways to level up your character. Playing in multiplayer builds experience points for your character, effectively allowing you to level up the more time you spend playing in

the multiplayer mode. It feels somewhat like an RPG, but with more moment-to-moment excitement. Leveling up rewards your character with more options, such as new classes (and the ability to create a class), and this adds more depth to the more standard multiplayer fare, such as Deathmatch, Search & Destroy, and so forth.

There's little to dislike about CoD4, but the single-player campaign in Normal mode lasts less than eight hours—longer at higher difficulties. Yes, it's a speedy 19-level experience, but the sheer intensity is deeply exciting and very memorable, resulting in the short play time being less of a black mark because you'll want to play through it more than once after the adrenaline rush dies down. However, the inability to play through CoD4 in at least two-player co-op is more glaring, especially when you play through the game with a squad at your side.

We played the PC and console versions and came away impressed with all. Obviously, the PC version looks best, but the 360 and PS3 versions are attractive. When compared to each other, they shine equally. The ultimate winner here is the gamer. CoD4 ranks as one of 2007's most intense and memorable single-player experiences, backed by robust multiplayer options second only to Halo 3 on Xbox 360. Overall, CoD4 is on our list of this year's best-crafted videogames and best-in-genre. It's a fine return to form after CoD3 and is the best the series has to offer in production values and gameplay. ▲



CRYSIS

It's Why You Own A PC -by Dr. Malaporop

\$49.99 (PC) • ESRB: (M)ature • Electronic Arts • www.ea.com/crysis

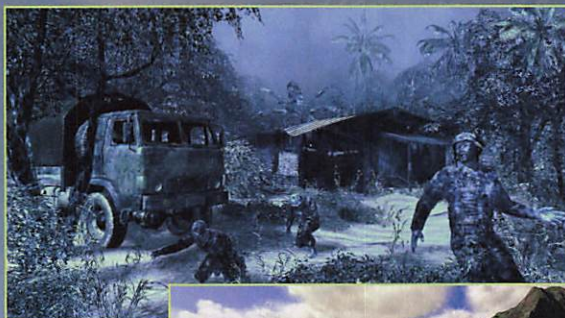
Developed by Crytek, the team behind Far Cry, Crysis is the type of graphical behemoth that sends next-gen consoles running to mommy. It might also do the same for less well-endowed PCs. One look at the near-photorealistic environments and eye candy in motion is proof that words and screenshots cannot accurately convey.

Gamers familiar with Far Cry will recognize some of Crysis' basics: sandbox island, gorgeous vistas, and pacing. An asteroid crashes into an island in the South China Sea. The U.S. loses contact with its ground team after the North Koreans take control of the area. Delta Force operators, garbed in state-of-the-art nano suits, are dropped into the area to take care of business. The nano suit is controlled by a radial menu,

which lets you boost strength, add armor strength, increase speed, activate cloaking, or improve weapons accuracy for a limited time based on your suit's power reserve. What starts out as a routine mission to recon the area while taking on the North Koreans ends up with the unexpected discovery of a spaceship—eventually taking on extraterrestrials in zero-g and other

varied environs, which benefits Crysis with a nonrepetitive feel.

Crysis has engaging gameplay, with numerous ways to play through the title using your suit's powers, an open level design, (mostly) good AI, and solid feel for weapons. The game's multiplayer mode is better than Far Cry but inexplicably eschews Team Deathmatch. The 32-player-per-side Power Struggle mode, however, adds depth and helps make up for it. Crysis is for the PC what Halo 3 was for Xbox 360 this year. It's a top-notch FPS that's in the running with a handful of other titles as 2007's Game Of The Year. Crysis is preconfigured to look even better in the future, which is a bonus for the hottest-looking PC game ever released. ▲



SILENT HILL ORIGINS



Handy, Travel-Sized Horror -by Chris Trumble

\$29.99 (PSP) • ESRB: (M)ature • Konami • www.konami.com

As its name suggests, *Silent Hill Origins* for the PSP is a prequel to Konami's long-running survival-horror franchise. The game tells the story of Travis Grady, a trucker with a dark past who makes the mistake of straying too close to Silent Hill and must fight to survive, and to figure out why his nightmares seem to be coming to life. SHO's controls are mostly unchanged from previous installations, and it looks pretty good on the PSP. Some play mechanics have changed, though, and with somewhat mixed results.

For example, Travis can use mirrors in the game to manually trigger the bizarre transformation of misty, deserted Silent Hill to the hellish otherworld that has been a constant theme throughout the series. Control freaks will love this, because it makes navigation of Silent Hill's creepy environs a little more straightforward, but it also destroys the tension that used to accompany these shifts, which were previously outside the player's control.

The game also forces a little more repetition than is ideal, as you scurry around fetching items you'll need to solve the puzzles that have long been a Silent Hill staple. But the puzzles are still fun, as is the combat, and the game still gives us the willies, which is what it's all about. ▲



of battle, and you decide where your ship and crew go next.

This gorgeous game is pure BioWare, packed to the gills with finely crafted dialogue that's important to keeping abreast of a fairly epic story. NPCs react to you differently depending on the tone you take with them, which helps avoid feeling like you are



It's the best of both worlds, really; you get to run around and shoot stuff like you're in a third-person actioner, but you can freeze the action

whenever you need to and mull your tactical options and give your squad their marching orders.

As much as we loved BioWare's *Knights of the Old Republic* games, *Mass Effect* seems a more satisfying experience in the final analysis. Like the *Star Wars* universe, *Mass Effect* is vast and engrossing, but it has the added allure of being new and unfettered by decades of experience. That's not to say

that there aren't heaps of very familiar items, characters, and themes scattered throughout, because longtime sci-fi fans will feel right at home here. It's also not the case that the game is without the occasional flaws. But upon entering *Mass Effect*, we found ourselves reveling in the simple joy of discovery and spending less time checking each character and event against a ledger of preconceived notions. ▲

MASS EFFECT™

Space Opera Gets Personal -by Chris Trumble

\$59.99 (Xbox 360) • ESRB: (M)ature • Microsoft Game Studios • masseffect.bioware.com

Put simply, *Mass Effect* is the perfect nerd storm. In one silver, DVD-sized package, you get sleek, powerful spaceships; enigmatic and sometimes dangerous alien species; colorful sidekicks; an arsenal of high-tech weapons; and a desperate battle to save the galaxy. The best part is that *you* are the hero; you control the flow and tone of the story's dialogue, you make important tactical decisions in the heat

moving along a set path and cannot really affect the events unfolding around you. And although there's plenty of action, the game rewards tactical savvy and efficient use of your cohorts, two of which may accompany you at a time. Your character and his/her comrades each fall into one of several character classes, each with a particular set of skills, strengths, and weaknesses, and it's up to you to choose wisely based on the mission you face.

ROCK BAND



Get The Party Started -by Dr. Malaprop

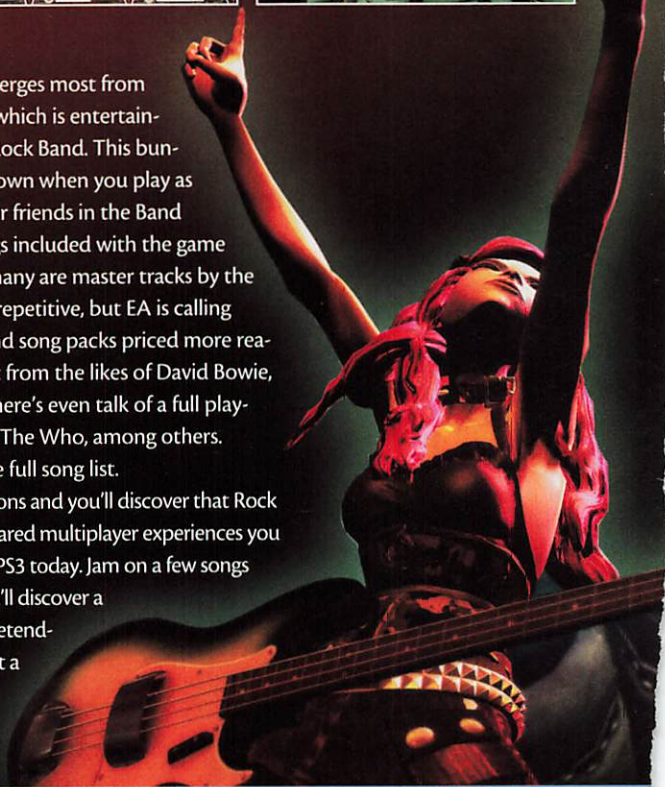
Bundle: \$169.99 (360, PS3) • Game Only: \$59.99 (360, PS3)

ESRB: (T)een • Electronic Arts • rockband.com

The Guitar Hero series broke out of the realm of rhythm gamers and raised hell in the mainstream. The combination of rock music and guitar peripherals let anyone playing the game feel like a rock star. So EA has opted for one-upsmanship by adding a corded guitar, drum set, and microphone into the mix. Add in your GH guitar to make up a four-piece rock band. (Nerdy, but who cares when you're having so much fun?) The included guitar will be instantly familiar to GH aficionados, although it doesn't feel quite as nice as what we're used to in the GH bundles. The USB microphone is pretty standard fare for anyone that's played Karaoke Revolution. The drums are the least toylike and provide an experience akin to that of a real drum set at the hardest levels—and may improve pre-existing drumming skills if you have them to start.

Where Rock Band diverges most from GH is in the solo mode, which is entertaining in GH but less so in Rock Band. This bundle really comes into its own when you play as a band with three of your friends in the Band Tour Mode. The 58 songs included with the game (45 of them licensed—many are master tracks by the original artists) may get repetitive, but EA is calling Rock Band a platform and song packs priced more reasonably than GH are out from the likes of David Bowie, The Police, and so on. There's even talk of a full playable album release from The Who, among others. Visit the Web site for the full song list.

Step past your inhibitions and you'll discover that Rock Band is one of the best shared multiplayer experiences you can have on the 360 and PS3 today. Jam on a few songs with your friends and you'll discover a vibe that will keep you pretending, er, playing for hours at a time. Yeah, baby, flaunt it when you got it. ▲



Makes The Wii More Than A Fad -by Dr. Malaprop

\$49.99 (Wii) • ESRB: (E)veryone • Nintendo

wii.nintendo.com/site/supermariogalaxy

Super Mario Galaxy, billed as the spiritual successor to Super Mario 64, presents itself as a true contender to its classic predecessor. Super Mario Galaxy manages to demonstrate how good a truly great 3D platform game can be. By comparison, Sony's Ratchet & Clank Future: Tools of Destruction for PS3 looks graphically stunning in next-gen but comes in a strong second when viewed against what Mario offers.

The storyline is not much to write home about: Bowser has kidnapped Princess Peach (along with her castle!), and you are going to travel across galaxies to save the day and rescue the princess. It's standard unimaginative Mario storytelling, but

you're not going to care much because you'll set about exploring more than 40 galaxies with their own unique, little, incredibly imaginative worlds. These galaxies have their own sets of rules, gravity, physics, and features, which makes navigating

the superb (often fiendish) levels a delightful romp from start to finish. Super Mario Galaxy revels in the nods to classic Mario gaming.

To the game's credit, the developers did not ruin the control scheme with overwrought waggle controls. A great portion of your time will be spent pointing your Wiimote at the screen while you control Mario's on-screen movements with the nunchuk. Part of the joy in playing this game is how seamlessly the controls work. Graphically, Super Mario Galaxy is the best-looking Wii game to date, complete with artwork befitting the game, smooth animations, attractive environments, and impressive effects. The audio is spot-on, with nostalgic sound effects and a soundtrack that's never tiresome. Nongamers and the younger ones can join the fun in a limited role that essentially supports Mario during the main game. If you've been lamenting the lack of a must-buy game for the Wii, stop whining and buy this game. ▲



AQUA TEEN HUNGER FORCE

Zombie Ninja Pro-Am

Food Behaving Badly -by Chris Trumble

\$29.99 (PS2) • ESRB: (M)ature • Midway • www.aquateengame.com

We all know how awful games bearing movie and TV licenses can be, right? But there are exceptions, and although nobody will ever hold Aqua Teen Hunger Force: Zombie Ninja Pro-Am up to Roger Ebert as a shining example of games as art, this is one of them.

ZNPA is a hodgepodge of events and minigames that individually aren't terribly special, but taken as a whole and slathered liberally with original dialogue (voiced by the show's cast) from everyone's favorite talking food-stuffs, they constitute a surprisingly entertaining whole.

Frylock has become a member of Jersey Pines, a South Jersey golf establishment that is somehow teeming with the trio's nemeses, and you'll race and fight them as Shake plots his revenge for being left off of Jersey Pines' membership rolls. ▲



BLACKSITE AREA 51



The Secret Is Out -by Chris Trumble

\$49.99 (PC); \$59.99 (X360) • ESRB: (T)een • Midway • www.blacksitegame.com

Midway has been taking gamers to the shadowy confines of Area 51 for more than a decade now, but in both the 1995/1996 arcade shooter and the 2005 FPS, the mission was mostly limited to the base itself. In BlackSite: Area 51, the dastardly E.T.s are out and about, ripping up the sleepy town of Rachel, Nev. You play the role of Aeran Pierce, a special-forces maven who has had run-ins with the paranormal before, during a tour in Iraq.

Gameplay is mostly by-the-book FPS action with some basic squad controls, and you'll spend your time taking out waves of aliens and the human-alien hybrids (called "reborn") they create, using a standard lineup of conventional weapons and some higher-tech hardware, as well.

Aside from some polish issues here and there, the game looks good (we looked at the PC version) and is fun to play. The developers' attempt to deal with a few weighty social issues could have used a tad more subtlety, but they don't hurt the game as much as the current glut of incredible FPSes might. ▲



The Cutting Edge

by Barry Brenesal

The Origins Of The Car

We're planning to buy a new car next year. We're due. Our current vehicle dates from 1995. We're going to be pragmatic about it, too: no hedonistic electrified butt warmers, for example. But we do want a hybrid electric model.

You might think electric cars are a recent development, but you'd be wrong. In fact, the image of Henry Ford as the inventor of cars is also wrong. And if you're thinking, "Well, at least he invented the auto assembly line," that's wrong, too. (Sorry about gloating like that.) Ransom Olds of Oldsmobile fame first developed it back in 1902, though it had existed before in other industries. Like the sound film, which I examined some time ago in this space, the automobile has a much longer history than most suppose.

The first documented, self-propelled road vehicle was actually built in 1801 by Richard Trevithick. He aptly named it Puffing Devil and demonstrated its capabilities by carrying several men from Camborne, England, to the village of Beacon. Three days later, it broke down crossing a rut—a nice modern touch, that—and the operators left it unattended while taking a meal at a local tavern. The engine overheated and exploded. The following year, Trevithick opened a steam-driven bus service with an inter-London route. However, it proved notoriously uncomfortable and was abandoned.

Another attempt to launch a similar service met with greater success beginning in the mid-1820s. Walter Hancock built 10 steam-driven, nonrailbound carriages over a decade, achieving speeds of up to 25 miles per hour and clocking thousands of miles of service. But Hancock's success with a newfangled mode of transportation was resented by the powerful backers of stage coach networks and the burgeoning railroad system, and Parliament was convinced to interfere on "safety grounds." This took the form of two laws, the first restricting any self-propelled vehicles from traveling more than 4 miles an hour, and the second requiring men waving red flags to precede and follow those vehicles doing 3 miles an hour or less. It was a farce, but one that played in Great Britain until 1896 and put paid to Hancock's vision.

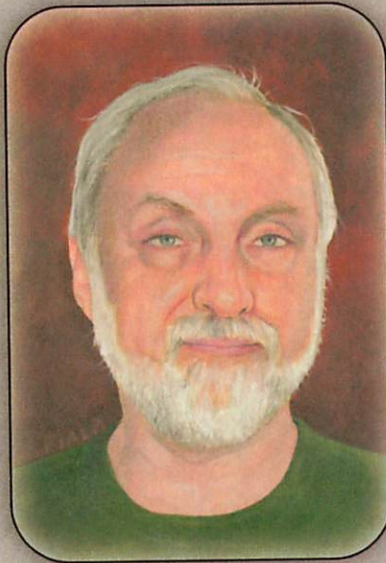
By the 1890s, though, Western Europe was certifiably car-mad, and the U.S. wasn't far

behind. Sensing this in 1895, the publisher of the *Chicago Times-Herald*, H.H. Kohlsaat, decided it would be great publicity to sponsor the first American automobile race. He chose a 54-mile course and scheduled the event for July 4th, but problems twice forced cancellations. The race finally came off on Thanksgiving, right after a notably early winter snowstorm. Sixteen doughty participants showed up. The R.H. Macy department store sponsored an electric model, as did the Philadelphia Storage Battery Company—one called, in a fit of inspiration, the Electrobat. The rest were gasoline vehicles, including three from the prestigious German firm owned by Karl Benz and one by J. Frank Duryea and his brother, bicycle mechanics from Springfield, Mass.

The Duryeas won, but perhaps it would be fairer to say that the snowstorm did. Only six of the 16 vehicles got away from the bitterly cold, wet starting line. Only two finished. (The other was a Benz.) The Electrobat's designers were prescient enough to provide for battery replacements at relay points, but the storm prevented their delivery. Gasoline-driven cars as a whole didn't cover themselves with glory—nor would they until the 1920s, when a combination of plummeting gas prices, a growing inter-city road network, and mass-produced internal combustion engines gave the gasoline-based car that final push over its rivals.

It didn't happen without a fight, of course. Witness the fighting words of Pedro Salom, electric car pioneer and owner of a fleet of New York City electric taxis that began operation in 1897: "All the gasoline motors we have seen belch forth from their exhaust pipe a continuous stream of partially unconsumed hydrocarbons in the form of a thin smoke with a highly noxious odor. Imagine thousands of such vehicles on the streets, each offering up its column of smell as a sacrifice for having displaced the superannuated horse, and consider whether such a system has general utility or adaptability."

Hence my column, this month, all about pollution: the cutting edge. Or was it cars? I forget. Until next month. ▲



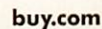
Barry Brenesal has written more than 1,000 published articles and reviews on electronic technology since 1987. His first personal computer was a Radio Shack TRS-80 model 100. It was last seen functioning as a boat anchor.

Wax nostalgic with Barry at
barry@cpumag.com



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Software Tips & Projects

Fixing Vista

Face it. At some point, all of us will have to deal with Windows Vista. Like it or not, almost every OEM now plants the controversial OS on all computers they are selling to your Aunt Sadie or son Eddie. Even if *you* opt out of this upgrade, tech dweebs like us will be called upon to troubleshoot someone else's Vista problem. In the year or so we have had the OS on our test bed, a number of widely shared problems and glitches arose. Here, then, is our first guide to overcoming the common headaches of Vista.

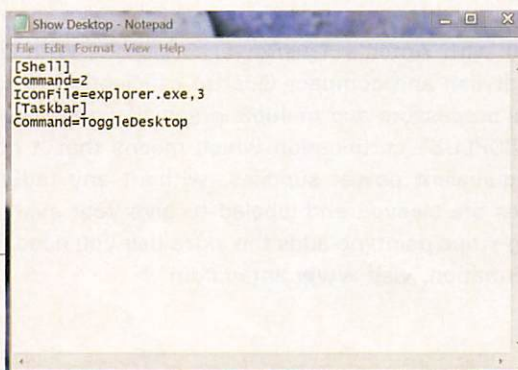
Network Woes

As we have written about previously in these pages, home networking with Vista can be an adventure. A constant irritation for us, however, comes with wireless networks that reconnect only to the Local Network without also linking to the router's outbound Internet connection. This happens repeatedly, and the first instinct is to disconnect the network link and reconnect. Instead, go into the Network And Sharing window and look for the red X between the Network name and the grayed-out Internet connection. Click the X to force the network to get a new IP address from the router. As often as not, this will establish the Internet link.

Another more troubling networking issue comes when the

Network And Sharing Center won't start properly at all. We and others have suffered various forms of a "Server execution failed" message coming from the Network icon in the Taskbar. For reasons that are still unclear to us from our research into the problem, an afflicted user still can access the Internet when this glitch occurs but cannot properly access other parts of their local network. We also experienced the loss of audio output functions. If this happens to you, there is one fix that we found on Microsoft's TechNet forums that did the trick for us.

Start a command prompt by typing **command** in the Start Search box. Right-click the command and use **Run As Administrator**. In the new window, type **cmd** to get a command prompt window. At the prompt, type **net localhost Administrators/add Local Service** and press ENTER. To check that the change worked, type **net localhosts Administrator** and you should see NT Local Service listed in the results. Now you should reboot to get normal network behavior and your audio back.



This simple script can restore your Show Desktop shortcut to the Quick Launch bar.

Some users have had to go into Windows Vista in Safe Mode in order to get the fix to work.

Elevate Your Commands

If you find yourself tinkering with Vista and command line entries, you may want a Desktop shortcut that always runs the command prompt as an Administrator. As above, call up the Command Prompt in the Start menu, but then right-click the program listing and use **Send To/Desktop** to make a shortcut. Now, right-click the new shortcut to bring up its Properties window. In the Shortcut tab, use the **Advanced** button and then check the **Run As**

Vista Tip Of The Month

If you've had it with Windows Vista, Microsoft says that you have the right to downgrade to WinXP in some cases. According to a company spokesperson, OEM versions of Vista Business and Vista Ultimate contain in their EULA downgrade rights to downgrade to Windows XP Professional, Tablet PC Edition, or Windows Professional x64 Edition. Ultimately, however, neither Microsoft nor the OEM is obliged to supply the old OS, but Microsoft is making this option available to the OEMs if they want to include the discs in the PC box. Users should contact their OEM for more information.

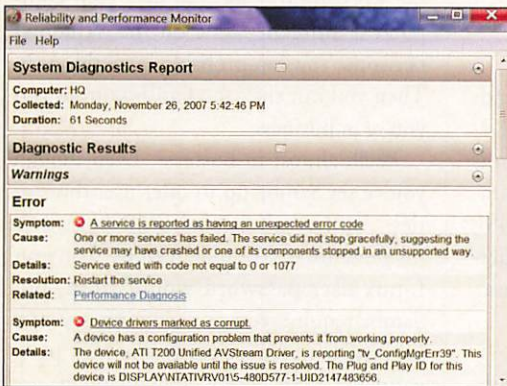
Registry Tweak Of The Month

The Regedit program typically opens at the last place you worked within the complex Registry directory tree. Finding your way back to the top of the tree and closing all of those branches can be tedious... unless you know the shortcut. To shut down all the open subkey and key branches of the Registry and return to the very top of the directory, simply press the Left arrow key. This repeated command will collapse the current branch and put you on the next branch up. Keeping the key depressed collapses the entire Registry structure quickly and highlights the top line. Tapping the Right arrow directional key at this point will reveal the five main HKEY hives.

Administrator box before clicking OK to all open windows.

Stop The Restarts

By default, Vista will restart itself when it runs into a fatal error, sometimes resulting in an endless loop of system errors followed by unwelcome restarts that can make it difficult to diagnose your problem. To disable this behavior, go into System in Control Panel and use the Advanced System Settings item in the Task pane. Click the Startup And Recovery Settings



Vista has a built-in Performance Monitor that will scan your PC and OS to locate potential problems.

button. In the next window, uncheck the box under System Failure that reads Automatic Restart. Click Apply or OK to enable the change.

Show Me The Desktop

The handy Show Desktop function is installed in the Quick Launch bar by default, but we have mistakenly deleted it on more than one occasion. This solution comes to us from FixMyVista.com. Open Notepad and type in the following script:

```
[Shell]
Command=2
IconFile=explorer.exe,3
[Taskbar]
Command=ToggleDesktop
```

Save the file to a convenient location or the Desktop as "Show Desktop.scf." You can drag the file or the resulting Desktop icon to your Quick Launch Bar to recreate the original function, which minimizes all open Windows.

Get The Report

Vista may be a pain for some, but at least it can help diagnose some of its own problems with the Performance Monitor. To have Vista scan itself for trouble spots, simply type **perfmon/report** in the Start Search box. This will start the Performance Monitor and generate a detailed log of errors and status readings. The first panel of Diagnostic Results will list warnings about system errors, such as services that are not loading properly. The Symptom line is a hotlink that brings you to a detailed log of the error.

What Happened To My Scissors?

Wait a minute. We know we had that Snipping Tool around here somewhere. Apparently, this handy screen capture device in Vista (type **snipping** in Start Search to find it) is a Tablet PC component. It will go missing if for some reason the OEM who installed the OS decided to save some system overhead by turning off the Tablet capabilities. Go into the Programs And Features item in

Control Panel and click Turn Windows Features On Or Off in the Tasks pane. If the Tablet PC Optional Components box is unchecked, then check it and click OK to have Snipping Tool and several other Tablet features reinstalled on the system.

Oops, I Deleted The Garbage Can

Because the Recycle Bin has a Delete option in its context menu, it's easy enough to delete it mistakenly. To get it back, right-click the Desktop and open the Personalize window. In the Task Pane, click Change Desktop Icons and recheck the Recycle Bin box to place the icon on your Desktop.

The Case Of The Faulty Index

You may find over time that the otherwise great Search mechanism in Vista is not delivering the results you expect. Emails and documents that you know to exist may not show up. To check for a real problem in the system, call up Indexing Options in

the Start Search box. Normally, this window should show you which drives and file types you included in your indexing. But you may receive instead an empty box and the message Waiting To Receive Indexing Status with no results, no matter how long you wait. This probably means your search index has gotten corrupted in some way. In this case, even the Modify and Advanced Options buttons are grayed out and inaccessible to you. It may be time to reset the index, which will tell Vista to rebuild the index from scratch.

Go into Regedit and find the Registry key HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows Search and double-click the value SetupCompletedSuccessfully. Change the value from 1 to 0 and reboot the PC. This will force Vista to rebuild the index. Keep in mind that it may take days of regular PC use for the indexing function to get all of your data back into the index, but you will be able to access the indexing options fully again and will see progressively better search results. ▲

by Steve Smith

Infinite Loop

PS3: Game Console, Blu-ray Player, Hacker

Sony went to great lengths to boast about the PS3's Cell processor's capabilities. It's no lie that Cell packs some serious punch, lending its processing muscle to distributed computing programs that we've covered in past issues. But a security researcher recently used the PS3 to

punch through an eight-character password in a few hours; previous tries took days. And you thought rootkits were the worst Sony-distributed threat.





Warm Up To Penguins

Do The Samba

Because it can run on very low-end hardware, even fanless systems, a Linux-driven centralized file server lets you focus your budget on fat drives. But you'll need to set up your Linux box for Microsoft's SMB protocol.

SMB is what you're using when you poke around Windows' Network Neighborhood. It also lets you share printers across systems. Starting in the early '90s, the Samba toolset has let Linux systems join the party. But until recently, configuring Samba was a bit of an arcane art.

One reason that Samba setup can be difficult to master is that it can do so many things. In addition to operating as a file and print server (and client), it can also act as a PDC (Primary Domain Controller) or secondary controller in a domain-based network infrastructure. Domain-based logins are normally found in large companies; they provide (among other things) single sign-on to all the computers in the domain.

One of the first signs of hope for the everyday user was the development of SWAT (Samba Web Administration Tool). With SWAT, you can configure the `smb.conf` file (which initializes Samba) via a more user-friendly Web interface on the local server rather than using `vi`.

These days, Samba configuration tends to be built into a distribution's GUI-based system administration tools. In this article, we'll look at how to set up a simple set of network shares using openSUSE 10.3. All the distros handle it a bit differently, but the basic concepts are constant.

Simple Setup

In the example, we have a local workgroup-based network called BlackBearSoft. We want to let users access their home (`~username`) directories from Windows. To do this, we used openSUSE's YAST (Yet Another Setup Tool). You can find the Samba Server setup under the Network Services tab.

The first thing to specify is the domain or workgroup name to join. If the Linux system is the first you'll set up, any name should work. Otherwise, use the same name that the Windows systems use.

On the next screen, YAST asked us if we wanted to set this server up as a PDC. For our simple home network, the answer to this is almost certainly "No." Then it presented us with a window with three tabs. The first tab (Start-Up) lets you specify whether you want to manually start the Samba server or let it load when the system boots. If you want your shares

available all the time (even if the system reboots), you'll want to opt for automatic startup during boot. It also asks if it can open a port in the Linux firewall for the SMB port; you should also check this.

The next tab, Shares, defines what directories on the system will be shared and who can access them. If you've ever set up a Windows directory as shared, you'll find this a bit familiar. For our purposes, we checked the Allow Users To Share Their Directories checkbox.

Finally, the Identity tab lets you change the workgroup name and give your computer a different name on the Windows network. You can probably leave this as is. Then you can click the Finish button, and you're in business.

Well, almost in business. Even though you've set Samba up to offer user directories, you haven't created SMB passwords for those users. You might think that your Linux user password would work, but Samba requires you to maintain a separate (although not necessarily unique) password for SMB access. To add them, use the `smbpasswd` program.

The easiest way from the command line is as root, or using `sudo`. At the command line, we typed `sudo smbpasswd -a james` and pressed ENTER. (The "`-a`" tells `smbpasswd` we're adding a user.) Next, we set a password and confirmed it, and `smbpasswd` informed us we successfully added a user.

Open-Source Shares

To access your shares from a Windows PC, open Explorer and type the IP address of the server in the Address bar. (In our example, it was 192.168.1.217.) A dialog box should prompt you for a username and password; this is what we just created from the openSUSE command line. When you log in, you'll see the shares available on the system. On openSUSE, if you take the defaults,



you'll see folders labeled Groups, Profiles, Users, and Printers. For our purposes, the one you want is Users. Double-click it to open your home directory on the Linux system.

There's a lot more on the server side of Samba. You can share printers hooked up to the Linux box. You can set up publicly accessible shares or private shares to non-user directories. You can also set up read-only shares. But now, let's look at how you can go the other way, accessing Windows shares from Linux.

Before you can do this, you need to map the Windows server's IP address to its name, using the file `/etc/samba/lmhosts`. In this file, you put IP addresses and the host names they translate to. So to add a server at 192.168.1.201 named "blackbearpc," you'd add a line that reads "192.168.2.201 blackbearpc."

Now you're ready to poke around. To do this manually, use `smbclient`. If you've ever used command-line FTP clients, you'll be comfortable with `smbclient`. To begin, we can list all the shares and services available on the remote host, using the `-L` option. At the command line, we typed `smbclient -U james -L //blackbearpc/` and pressed ENTER. We entered our password and received the following output:

```
Domain=[BLACKBEARPC]
OS=[Windows Vista (TM) Home
Premium 6000]
```

```
Server=[Windows Vista (TM) Home
Premium 6.0]
```

Sharename	Type	Comment
-----	----	-----
ADMIN\$	Disk	Remote Admin
CS	Disk	Default share
HS	Disk	Default share
IPCS	IPC	Remote IP
Shared Disk		

If your Linux and Windows usernames are identical, you can leave out the `"-U <username>"` part. The last part of the command is the path to the server, but the backslashes you normally associate with Windows are just slashes in Linux.

If you see a share (conveniently labeled "Shared" in our example), open it with a similar command. In our example, we typed `smbclient -U james //blackbearpc/Shared` and pressed ENTER. After the initial text output, we typed `ls` at `smb: \>` and received the following output:

```
.          D   0 Tue Nov 27 20:52:25
2007
..         D   0 Tue Nov 27 20:52:25
2007
```

```
58311 blocks of size 8388608. 9152
blocks available
```

There's not much there at the moment, so let's put a file (let's say "stuff.txt") in it. We typed `put stuff.txt` and pressed ENTER.

Of course, moving stuff around with the command line is clumsy, so what you really want to do is mount (running the program `mount`, appropriately) it as a local drive. At the command line, we typed `sudo mount -t cifs -o username=james //192.168.1.201/shared /mnt` and pressed ENTER. We entered our password, and then typed `ls /mnt` and pressed ENTER to receive the following output:

```
stuff1.txt stuff.txt
```

CIFS (Common Internet File System) is the new Microsoft name for SMB. The `"-o username=<username>"` is important because otherwise `mount` will use root as

the username it passes to the Windows server. Strangely, `mount` uses `/etc/hosts` to resolve the hostname rather than `/etc/samba/lmhosts`, so you'll have to add your server there, as well, or use the IP address. You can also browse remote Windows shares from Nautilus using the format:

```
smb://192.168.1.201/
```

You can also use the `/etc/fstab` file to request that the share be mounted whenever the system boots, although that may delay the boot process a bit if the server is down.

We've just scratched the surface of what you can do with Samba, and you'll have to make some adjustments for your particular distribution. But Samba's the key to have your Linux and Windows PCs dancing to the same tune. ▲

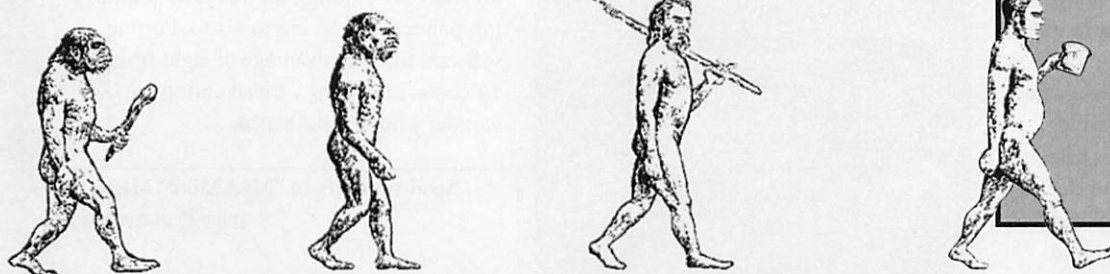
by James Turner

Infinite Loop

Would You Like Cheese On Your Prokaryote Hoagie?

You've probably heard of the "soup" theory of the origin of life, and biology buffs are probably familiar with the "pizza" theory, too. But a biochemist at the University of California, Santa Barbara, believes that life may have begun under more high-carb conditions. Helena Hansama proposed the "sandwich" theory: Thin sheets of mica ("which look like the bread") may have created a shelter to protect developing single-cell organisms from the elements. Thankfully, Jared Fogle wasn't around to literally devour all life before it could propagate.

Source: news.nationalgeographic.com/news/2007/12/071210-life-origins.html



Shavings From The Rumour Mill

by Mike Magee

Eight Cores Won't Make For Better Software

I don't want to get over-technic about things, but some 25 years ago now, I used to develop software. I am old. Just look at my picture.

These were the early days of the PC when you had to do really crazy things to make your applications run well on the X86. For example, the way the IBM PC was designed meant you had to write directly to video memory and, worse than that, there was no video standard.

Hercules made a high-resolution graphics card that performed a far better job than IBM's standard offerings, but it was very expensive, and if you were a code writer, you had to totally understand the completely different way software had to be written to make things work. Basically, there were all sorts of nonstandard bits of hardware, which meant any software development tyro needed to understand the hardware.

That principle hasn't really changed, even though we've come a long, long way since the first IBM PC.

Now, whether we like it or not, both AMD and Intel have thrown us into the age of dual-core and quad-core processors, and there's a whole debate going on about how best to use that power, along with the vast amounts of storage and memory, eye-popping screen resolutions, and sophisticated sound systems we all have.

The fact is that PC hardware is now so ahead of software that you'd be forgiven for thinking that the software programmers had all turned into Rip van Winkle. What do AMD and Intel say when you ask them about this? They say that there are plenty of tools developers can use to take advantage of multiple cores so their software makes the world better for all humankind. But maybe you remember the Intel gimmick called Hyper-Threading. Intel made a big song and dance about how HT could improve the performance of software applications, but if you heard software developers getting excited about this, then your hearing is probably far better than ours.

I am sure some specialised apps were written to take advantage of Hyper-Threading, but the vast majority ignored it, their developers probably realising that increases in clock speed meant that the sheer effort required wouldn't make a whole heap of difference.

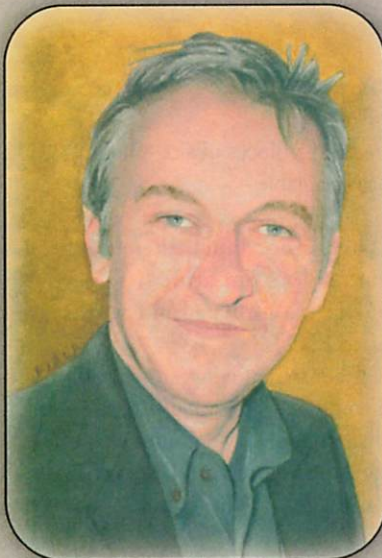
So what do we have right now? We have 64-bit operating systems with a dearth of 64-bit drivers because no one needs them. We have graphics chips in different flavours from Nvidia and ATI/AMD that don't really bring a whole lot to the party because we've got so much eye candy that our eyes have lost their appetite. Intel and AMD are promising us more quad-cores, followed by eight-core systems and who knows how many more after that.

Yet there are some applications that would really help our increasingly digital lives. With the memory card in my digital camera holding many more snaps, all with cryptic names like DSCN1940, and my huge hard drive littered with multiple instances of similar file names, wouldn't it be nice if when you took a snap, a GPS module in your digital camera clocked the geographical coordinates and time, so that a piece of software was able to file all these images according to place and time?

I used to write about future roadmaps from AMD and Intel quite regularly in this column, but even CPU roadmaps ain't what they used to be. That's because it's hard to get excited by Intel's Nehalem, due to arrive next year, when it basically does the same sort of thing as AMD's current CPU system architecture. Yes, there will be a performance boost, but the software you use isn't going to get that much more exciting.

Hard too to enthuse about AMD's Fusion plans, because they're so indeterminate now that it won't be until well down the line that we see if they bring anything extra to the PC party.

Unless and until software—whether it be games or ordinary productivity apps—catches up with the hardware and begins to do really tasty things, all this extra processing power is just going to waste. Porting software to take advantage of eight or even 16 cores is far from a trivial endeavour. We wonder who will bother. ▲



Mike Magee is an industry veteran. He cut his teeth on ancient products like the Dragon and the Japanese PC platforms long before the IBM-PC won. He worked for a corporate reseller in the mid-'80s and saw the Compaq 386 sandwich box and every GUI known to humankind. Mike decided that the way to go was the Interweb around 1994 after editing PC mags in the late '80s and '90s. A co-founder of The Register, Mike started the chip-driven INQUIRER (www.theinquirer.net) in 2001. He has contacts from top to bottom in the business, spanning the entire chain, who help him root out interesting rumours and speculation.

Send rumours to "Mad Mike" Magee at mike@cpumag.com

Wagging The Dog

by Rahul Sood

All Aboard The AMD Roller Coaster!

What happens when a company grows too quickly? AMD clicked and clacked along a fairly bumpy track for a few years before beginning a sudden, 90-degree climb. The company rose higher and higher, building up speed and picking up passengers on its way to the top of the hill. Then all of a sudden, the now massive green roller coaster crested the towering track it had climbed and plummeted downward to mediocrity at the speed of sound, perhaps accelerating even faster as a large, new group of riders jumped on.

This seems to be the story of AMD in a nutshell, and unfortunately, things are looking somewhat bleak for the moment. Some are quick to defend the chipmaker, pointing out that AMD has seen tough times before, and that's true. The difference, of course, is that the company is now vastly bigger than it was five or so years ago. AMD has more people and greater manufacturing capacity than at any time in its history, and all the baggage that comes with them. And now, as it fights for survival, the company has also placed great importance on a very expensive legal battle with Intel. In the midst of all of this, it seems as though AMD has all but lost its focus on its core competencies. In the meantime, Intel has grown stronger, nimbler, and more competitive than ever before.

AMD acquired ATI on the way down the roller coaster, or later than would have been ideal. I am still a firm believer that the ATI move was a good one; the vision of Fusion is a compelling one, but it will require laser-focused execution to make that vision a reality.

To make matters worse, AMD took on new and demanding customers who all but forced it to increase manufacturing capacity, only to get caught in a price war with Intel, which caused some shifts in the industry that the company didn't expect.

AMD may lose key customers in the near future, but maybe that's a good thing. Some customers are absolute grinders at any cost.

They'll take out the biggest meat grinder in the world and press it hard and long against their suppliers to the point where it could be detrimental to the quality of their own product.

A wise man once shared an old Mexican proverb with me over lunch. He said, "Rahul, when you sup with the devil, use a very long spoon." It seems AMD may have used a slightly shorter

spoon than it should have when making some of its strategic moves and now finds itself involved in some unhealthy relationships that are likely costing more money than the company can afford.

Is the outlook all doom and gloom? Certainly not. I believe AMD can turn it around, but it's going to take some work. I think it's time AMD takes a look at articles I wrote about Intel a couple years ago and substitutes "AMD" for "Intel." In other words, if I were CEO of AMD, here's what I would say as we began to turn things around.

"It's time to focus on what we do best; it's high time we build and nurture key partnerships. Partners and how we structure our partnerships are going to be a key to our success going forward. We should also drop money-losing opportunities, scale back, and re-ignite the innovation team. We should bring 'Customer-Centric Innovation' back to the foreground. Coupled with the right partners, this may actually work to help us turn things around. And don't worry about what Wall Street says when or if we lose a big account—as we turn things around, the numbers won't lie. It's time to go back and figure things out; we don't have much time to mess around. It's time to heal our wounds, back off from a head-to-head battle, and eventually we'll be back."

Of course, all of this is just my opinion, and as usual I wish AMD nothing but the best of luck in the future. ▲



Rahul Sood's love for computers started at the young age of 11. Much to the shock and dismay of his parents, he ripped apart his brand-new Apple IIc and painted it red before turning it on. His parents' dreams of having a doctor for a son were shattered when college drop-out Rahul founded what is now one of the most respected high-end computer companies in the world, Voodoo Computers.

Send your opinions to this opinionated guy at rahul@cpumag.com

Look For CPU At These LAN Parties Across The Nation!

01.03.08

MagFest, Alexandria, VA
magfest.org/index.php

01.05.08

Whempy's LAN Party, Columbus, OH
www.whempys.com

01.11.08

Prodigy LAN, Silverton, OR
www.prodigylan.com

01.26.08

Carolina Games Summit, Goldsboro, NC
www.carolinagamessummit.com

PeaceLoveandRockets, Arlington, TX
www.peaceloveandrockets.org

02.16.08

AsylumLAN, Evansville, IN
asylumlan.com/lanparty

2.22.2008

Netwar 15.0, Omaha, NE
www.netwar.org

02.23.08

Appalachian State University Gaming Club, Boone, NC
www.gaming.appstate.edu

03.01.08

Iron Storm 7, Castle Shannon, PA
www.pittco.org

03.07.08

Digital Overload, Providence, RI
www.digital-overload.com

04.01.08

theGXL, Millville, NJ
www.thegxl.com

04.11.08

LAN OC, Ohio City, OH
www.lanoc.org

04.19.08

Appalachian State University Gaming Club, Boone, NC
www.gaming.appstate.edu

NEARFF, Searcy, AR

www.harriscustompcs.com/nearff

Spring 2008

Xodus, Rochester, NY
www.egslan.com

05.01.08

NVGASUPERCON, Albuquerque, NM
www.nvgasupercon.com

05.26.08

NEXLAN, Spokane, WA
www.nexgenconsulting.net

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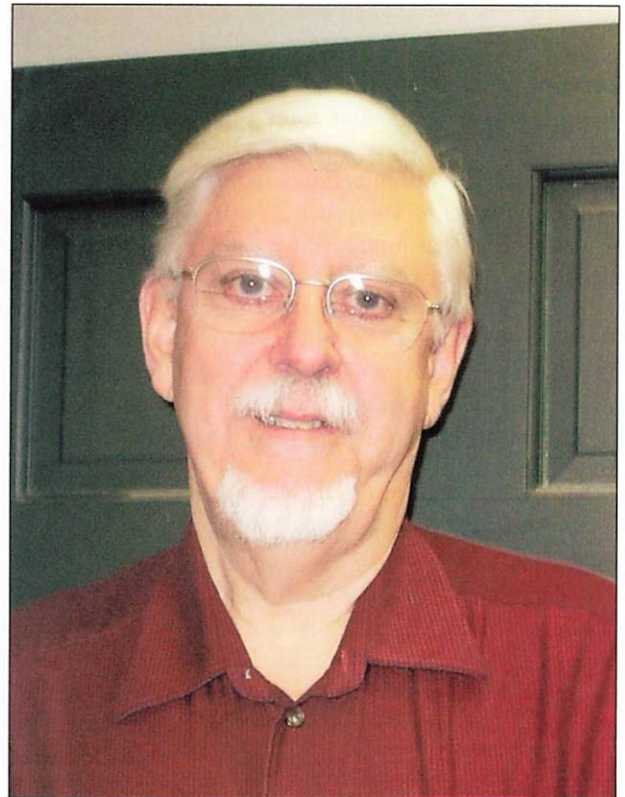
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Technically Speaking

An Interview With Tom Easton, Author
& Professor Of Science, Thomas College

Tom Easton is Professor of Science at Thomas College in Waterville, Maine. He is an author of many published works, both nonfiction and science fiction. Two of his most recent in the former category are "Taking Sides: Clashing Views on Controversial Environmental Issues" and "Taking Sides: Clashing Views on Issues in Science, Technology, and Society." He maintains a blog at Technoprobe (technoprobe.blogspot.com).

by Barry Brenesal



CPU: Computers would seem to be made for the task of linguistic translation, since they can retain and apply an enormous number of rules to a given text almost instantaneously. Why hasn't that happened? Why do computer translations, even the best ones, fall short?

Easton: Let's start with the Turing Test, which was designed to determine whether a machine could demonstrate intelligence. The one time it was successfully passed was in the mid-'60s. The developer was a fellow at Stanford, both a psychiatrist and a computer scientist, by the name of Kenneth Mark Colby. His program imitated a paranoid schizophrenic. When interviewed by psychiatrists, they couldn't tell the program from reality. The thing about a paranoid schizophrenic is that it responds with basically one reaction. No matter what you say, it answers with a variant of, "You're out to get me." But as soon as you switch to a sane human being, they have a much larger repertoire available. That's something a computer can't do.

Similarly, with computer translations, one of the things they have found is that you can do computer translations successfully—in a restricted domain of discourse.

If the vocabulary is limited, such as a translation of engineering documents or computer manuals, you can have a computer actually do a decent job. There may be problems with it, but they will be relatively small.

CPU: It's when you get into multiple meanings, synonyms...

Easton: Where you most have success in a restricted vocabulary is where you're only using a few of the synonyms. If you're using the word "hand" and you're talking about haberdashery, you're discussing gloves, or the feel of the fabric. But if you're talking poker, that's something different. Nobody's going to get confused as long as the rest of the vocabulary is poker. This is context. And the computer has a great deal of difficulty telling what the context is unless you start off by defining that.

CPU: And that doesn't even begin to cover the difficulties of a computer understanding shifts of meaning through verbal inflection.

Easton: It's easy for people to illustrate the various ways in which you can mean different things by changing the tone. One of my favorite examples goes way back to a song that was once banned from the radio. It only had two words: "John" and "Mary." The rest was totally a matter of inflection. A machine listening to it might wonder, "What's the fuss?" but human beings got horribly worked up over that thing. There was nothing obscene about it except in the listener's mind, and that was enough.

CPU: There are some languages in which verbal inflection is an essential and major element, such as Japanese.

Easton: Japanese, Chinese—you almost have to be able to sing them. One of the funny things that comes out of some of the research is that you don't really find as many tone-deaf people in those cultures as you do in ours.

CPU: Are there problems other than these to confront in computer translation?

Easton: There are other problems that show us how the computer alone isn't really up to the job. We've got OCR, Optical Character Recognition. It is beautiful stuff, the ultimate backup paper. As long as you have a clean printout, it doesn't matter if you lose your hard drive. You just put it through the scanner and say, "Make me a file again." But if you don't have a clean copy, if you use one of these fourth-generation photocopies or a moth-eaten, water-stained manuscript from the Middle Ages, OCR is useless.

One of the things we've been doing lately is to break this apart into chunks and use those as captures. People who view these don't even know they're helping you out. But they tell you how those captures are supposed to be read. Then you stitch the bits together, and you have your result. It puts the human in the loop. The ChaCha search engine does this, too.

CPU: Let's go back to an example that we discussed before our interview. It was a situation that occurred recently, where a group of Israeli journalists, presumably

Should we let the kids use calculators? Certainly, we shouldn't let them use calculators for exams, but for the rest, after a while, it got accepted. However, we still had to teach the kids how to get the answers without the calculators. So that if the batteries are weak, or the buttons aren't clicking properly, they can do the math. And that is a struggle, because the machine is supposed to give you the right answer. But it is not always right. It's just a calculator. And if it's a bigger, better, more powerful computer, then getting that point across is even more of a struggle.

CPU: So we can extrapolate from this that if we have a computerized translation tool, it's therefore been programmed thoroughly by people who know all the languages they've included, and the results are going to be perfect.

Easton: The layman thinks that way, yes. Now the person who is a superlatively skilled programmer knows where the complications are: homonyms, synonyms, inflection, etc.

system that will allow you to pick up a piece of paper in the field, scan it with your cell phone, and then have the signal sent back to Washington and receive a translation instantly—the dream of that is driving a lot of this funding. The dream would be to automate it with a computer, partly because a computer is fast. If you're trying to detect terrorist activity, being able to translate documents on the fly would be a real boon.

Another version of the dream is to scan the document in the field, get a partial translation, send it to an external expert in order to clear up ambiguities, and then it stumbles: Does this expert have a suitable security clearance? If we can't do that, we're stuck. But the computer translation by itself is difficult.

I think we will solve the problem, one day. Hans Moravec—robotics specialist out of Carnegie Mellon—has been speaking about this for years. He says that by 2050, our computers are going to be big enough, complex enough to hold the contents of a human brain. At the same time, he says that what we need is to develop a method that would

We trust the machine. We sanctify it. We idolize it. We've been told that 'the thinking machine is the great enemy of error.'

—Tom Easton

lacking time, simply used Babelfish while preparing questions for the Dutch Foreign Ministry. The submitted queries began, "The mother your visit in Israel is a sleep to the favor or to the bed your mind on the conflict are Israeli Palestinian." Leaving aside the lack of professionalism that shows in not double-checking everything, why would anyone ever use Babelfish as a serious tool?

Easton: We trust the machine. We sanctify it. We idolize it. We've been told that "the thinking machine is the great enemy of error." For example, following the early '70s, when the first portable calculators came out, there was a big fight in the elementary schools:

CPU: So we're left with translation tools that people believe work, but in all but the most basic of ways, don't. Still, it might be expected, given the way pop culture reinforces this notion you've discussed of machine infallibility. But then we come to a government of elected officials, who dispense vast amounts of power and capital. And they actually put their faith in computerized translations.

Easton: The government that is putting money into the research of this is eager to have something that will simplify the intelligence gathering task. I've seen discussions where they talk about the difficulty of sorting through bales of documents on Afghanistan and Iraq. Having a

transfer the human mind from the meat box to the electronic box. Ray Kurzweil talks the same way. Presumably, it's not just going to be a box for the brain, but a box for the body, and personally, I would love it. I'm 63. If I could make it to 2040, my meat box is not going to be in very good shape. I'd love to have an alternative waiting for me. Then you could translate with electronic speed. And you wouldn't have to die.

CPU: Meat box miracles to one side, in the meantime, we have GALE: Global Autonomous Language Exploitation, don't we? Defense Department-funded computer translation software that by 2010 is supposed to achieve 75% accuracy

on text. The goalpost is 65% accuracy at first for speech.

Easton: I think they will be successful first with text. Because you avoid most of the ambiguities that way, though some of your homonyms still have different spellings. And you avoid the issue of inflections. The Defense Department talks about the ideal being a laptop that a soldier holds, an Iraqi speaks, and it's translated into English for the soldier. He speaks, and it comes out in Arabic, for that Iraqi. If you can get it to the point where you actually can translate speech on the fly, that's a cool trick. But I don't think we're going to be doing anything like that in a reliable sense for a while.

Babelfish is by no means cutting-edge, but it does illustrate the issue. The computer software will try very hard to get somewhere near what you're trying to say. But I think the best you can count on is getting the gist.

CPU: The other side of this issue is computer-assisted translation, with

Easton: That runs into those clearance issues we spoke about, when you get away from central.

CPU: Is there any way to resolve that, in your opinion?

Easton: Not as long as the Defense Department refuses to trust the general public. Though "innocent until proven otherwise" would actually help make something like that work. And that particular aspect of government ideology is going to interfere with the dream of a widespread Web of translation services.

CPU: So the dream will remain a dream?

Easton: It won't be virtual. You'll need a lot of people in a building, everybody carrying clearance tags. It'll be something like a UN, where they hire a lot of people with a gift for a language, who are good enough to do this simultaneous translation thing. You might be able to get away with hiring people who aren't that good at it, if

of the things they could do would be to encourage immigration from the geographical areas they're interested in, then give the immigrants those jobs. Or encourage more language education. Colleges are getting very expensive. Funding people to major in Russian, Chinese, Japanese—whatever, as long as they come to work for the translation center when they're done—would solve the problem. An interesting wrinkle would be to say, "We'll pay for your college education. When you're done, if you pass the security clearance, you're hired. If you don't pass it, you pay us back on your education. Keep your nose clean."

CPU: If we ignore the government for the moment, are commercial interests getting involved in the field of human-assisted translation in a big way?

Easton: There's a lot of work going into that. In fact, the business community is very interested in the same issues,

The government that is putting money into the research of this is eager to have something that will simplify the intelligence-gathering task.

—Tom Easton

human involvement. On your Web site, you quoted Michael Erard's article, "Translation in the Age of Terror," from *Technology Review*. In that article, he in turn quotes an official from the Department of Defense, referring to "a dream of 20 years come true," the National Virtual Translation Center—a Bauhaus of a name. He goes on, "If it works, the center will tie together emerging translation-assistance technologies and deploy them efficiently on a massive scale. Administered from the DC offices, the translation Web will also leverage the skills of people spread all over the U.S.: professors, contract translators, government linguists—greenhorn 20-somethings and retirees alike."

they're computer-assisted and don't have to do it simultaneously. But they would still have to be able to crank out the translations in a hurry to be useful.

CPU: In an enormous hurry.

Easton: A lot of documents.

CPU: And time-sensitive, as well.

Easton: Exactly.

CPU: There's no economy of scale here, is there?

Easton: If the federal government were really to get serious about this, one

and for the same reasons as the government is. They keep an eye on the government research projects, because if something gets developed, they want to be able to use it, too. There are plenty of companies out there that will do your translations for you or sell you the software to do them. Corporations shift an awful lot of documents across borders. In some businesses, such as IT, English is as much a *lingua franca* as it is in air traffic control. But in other areas, it helps a great deal to have people who can speak multiple languages. There's a need. They are putting money into computer-assisted translation. **CPU**

Under Development

A Peek At What's Brewing In The Laboratory

Making 3D Art Out Of Thin Air

Artists who work with 3D modeling and drawing programs have long been hindered by the fact that the computer still requires them to input their work in two dimensions—using a mouse and drawing pad. Now, Daniel Keefe, along with colleagues Robert C. Zelenik and David H. Laidlaw, has developed a new system that promises to change that, letting artists “sculpt” complex 3D illustrations in midair.

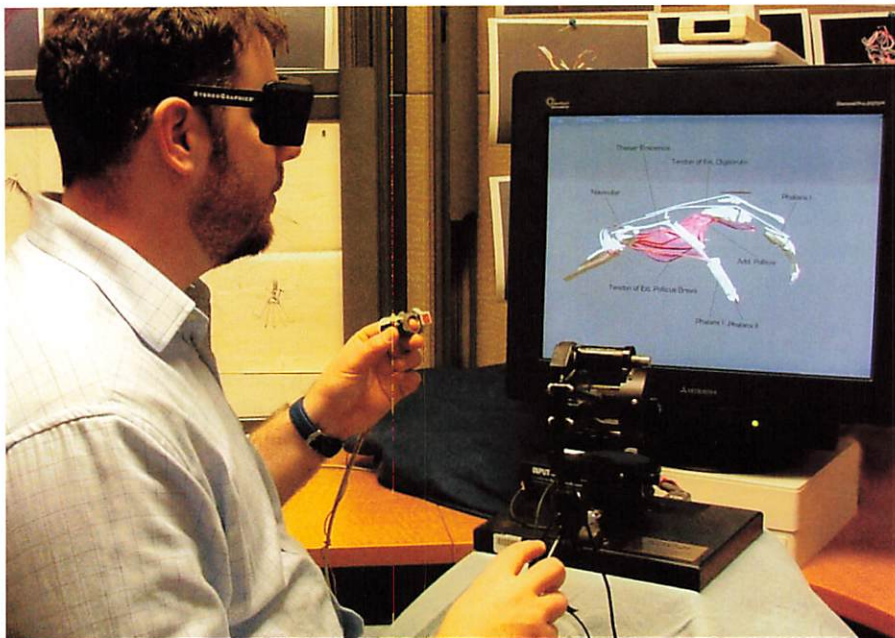
“Drawing on Air” is a haptic-aided 3D drawing system that gives artists, designers, and illustrators the ability to use their hands to create detailed, precise images and then transfer them to a computer’s 3D modeling and design programs. Although the target audience for the program includes artists and illustrators, there are also interesting applications in the scientific world, helping researchers design virtual reality displays of difficult-to-understand scientific data.

To use the program, a user wears virtual reality goggles that sync with the computer

screen in order to create the illusion that the image she is drawing is floating in midair. In the user’s dominant hand, a stylus gives force feedback; the other hand wears a tracking device. This allows two-handed drawing that provides a great deal of control and precision in drawing lines and curves. It also permits one-handed drawing with the stylus only.

The haptic feedback that the artist receives through the stylus provides additional control over line thickness and color. Applying more pressure produces thicker lines. And once the artist draws the object, she can grab it and rotate it to examine and edit it from different angles. Keefe has no current plans to market his system commercially but will continue investigating other applications of technology.

“The hardware used is quite expensive, but developing alternative means of realizing the tool and/or waiting a few years for the hardware to become more mainstream might be first steps toward making the technology more widely available,” Keefe says. ▲



Daniel Keefe using his “Drawing on Air” system. The desktop virtual reality display allows him to see stereo imagery, and the force feedback and tracking devices provide haptic feedback that give him precise control over his drawing. (Image: Daniel Keefe)

MIT Develops Tiny Tractor Beam

How do you move microscopic objects around on the surface of a silicon chip? If you’re MIT researcher Matthew Lang or David Appleyard, you simply pick them up and move them with a beam of light. The new technology they’ve developed could soon be used as a tool in biological and materials research and may one day even be applied in the microelectronics industry as a way of building sensors electrical components.

Although it might not sound like anything new or remarkable (after all, optical tweezers that use light to move tiny objects have been around for decades), the system that Lang and Appleyard have developed is different in that it works on silicon, an opaque substance. Previously, a laser produced the light beams, requiring a transparent glass surface to let the laser shine through. The new method produces infrared light beams, which pass directly through silicon, instead of visible light.

The infrared light holds the object and can lift it slightly, pushing and pulling it around the surface wherever a user wants. In tests, the system was able to move beads and cells that ranged in size from a few nanometers to a whopping 20 micrometers across. This size range encompasses nearly all types of living cells.

Because the tool lets someone precisely control the placement of materials on a chip, it could soon be a valuable tool for biological research in which researchers must place cells directly next to sensors in order to monitor them. ▲

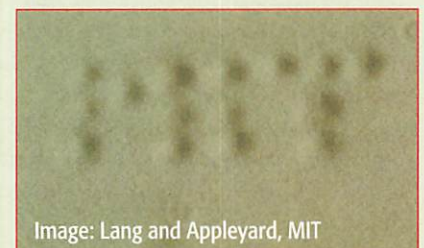


Image: Lang and Appleyard, MIT

Online Game Helps Search Engine Learn

Despite the tremendous amount of music now available online, it can still be hard to find new tunes that you really like. Wouldn't it be great if there were a search engine that returned a list of songs that matched a description of the type of music you wanted, say, "high-energy acoustic with tight harmonies and fun lyrics"?

A group of researchers at the University of California - San Diego are working toward creating just that kind of search engine, and they're doing it in a very interesting way: by using a multiplayer online game to gather the data needed to train their "computer audition system" to automatically annotate new music.

The Listen Game presents players with musical categories such as "instrumentation," "emotional content," "musical genre," and "song characteristics." It then plays a series of seven song clips. For each clip, players receive six words and are asked to select the one that best describes the music and the one that least describes it, in relation to the given category. Players compete against others, who are signed in concurrently, and the game awards points when players agree on the words; it awards more points as the number of players who agree on the words increases. There is also a freestyle round where a user enters his

own descriptive word, which is then presented in the next round as one of the choices; if others pick that word, the user who entered it receives points.

Around 500 people have played the prototype game since its inception, spending anywhere from a few minutes to more than an hour matching their responses against other players.

Lankriet says that the team is getting ready to release a new, more graphically appealing version to release to the broader

public. "Listen Game was a prototype game, mainly presented to our research community (a limited public) to investigate the possibility of collecting information from humans playing games around music. The answer to this turned out to be 'Yes, we can do so.'"

Although the current Listen Game is no longer maintained, the new version is nearly finished and will let users either play anonymously or log in to customize the game and interact with other players. ▲



Old Memory, New Tricks

In the quest for memory of the future, sometimes it doesn't hurt to remember the old chestnut "everything old is new again." That's the path that scientists at Arizona State University's CANi (Center for Applied Nanoionics) took when they decided to modify materials already used in manufacturing present-day silicon chips to create a new type of memory that promises more storage, faster performance, and significantly less energy consumption than current technologies.

PMC (programmable-metalization cell), or nanoionic

memory, developed at ASU, is created by "doping" silicon oxide with a small amount of copper, both of which are materials that are used in current-day memory chips. By mixing the copper with the silicon oxide, the copper becomes mobile. When current is applied, the copper atoms rearrange, forming a nanoscale switch.

Because nanoionic memory uses differences in resistance states rather than differences in charge to store information, the ASU research team can stack memory cells on top of one another, and each cell can

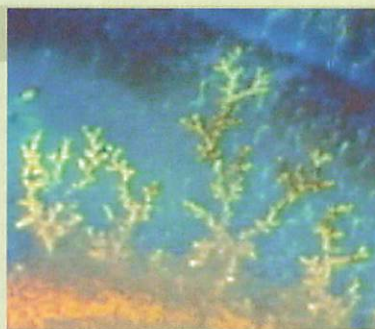


Image: Chakku Gopalan

could be produced within the next two years.

"We are beyond the 'science project' stage of the development of this technology," says Michael Kozicki, CANi's director. "Real products are currently in development, but whether they survive the tortures of the real world or not has still to be determined. We are highly optimistic, though. This technology has attributes, including a 'self-healing' capability, that make survival and eventual widespread deployment highly likely." ▲

hold multiple bits of information. This leads to the potential for significantly higher storage density; a 1TB memory card or thumb drive is well within the realm of possibility.

A few companies, including Micron and Qimonda, have already licensed the technology, and it's possible that the first nanoionic memory chips

Q&A With Chris Rice

Chris Rice is the chief technology officer of AT&T. He is the man who has to decide how AT&T will spend billions on its voice, wireless, and broadband networks. Over time, Rice is trying to migrate all of AT&T's networks to a single Internet Protocol-based network so that the company can cut its costs and roll out advanced services such as U-Verse, an IPTV service which competes with cable TV to deliver video programming over phone lines into homes.

Q What is the update on IPTV and how it is rolling out?

CR The customer response has been fantastic. We hit the 100,000 mark. That was very good for us. It talks about the scalability and maturity of the product. Customer response has been absolutely great for interest in our product. Once they get it, they are very impressed with the video quality, the functionality, the interactive guide, the fast channel-changing, the option of using the arrow keys to change channels while you have a picture-in-picture visible. You can see how much time is left in a show. In a number of installs, customers have left a satellite provider or incumbent cable provider. The clarity of the picture just kind of wows them.

Q What will get people to change from something they have done for years?

CR The bundle and the pricing gets them to change. If I have the opportunity to buy my video, voice, broadband, and wireless, that's a good deal. At the price we have in the market, with the type of content you get, with the HD recorder with every purchase, you are willing to pay for that because you pay extra for that at cable companies.

Q How's the iPhone gone overall?

CR It's more than met our expectations for the volumes, customer satisfaction, and the success. Apple has been saying the same.

Q There were reports of people hacking into it.

CR Like any technology, there is some small community of people that will hack something. One that was widely publicized was a hardware hack that wasn't easy to do. There were groups of people helping out. I don't see that as being a major issue. There are software hacks. I don't think it is a big concern for us.

Q What big decisions do you have to make? There is a big chess game going on with spending by the telecom and cable companies now.

CR I have to decide if I am deciding to buy the right technology. Fiber to the curb or fiber to the premises. The timing of when you do that. If you do it too early, you get stranded with technology that isn't scalable or mature. You have to weigh the investment dollars on the wireline versus the wireless network. You have to choose the right protocol and make sure the industry doesn't go another direction. You can choose a protocol for differentiation, but you will want it to be inter-networked.

Q What is this multiple-screen concept?

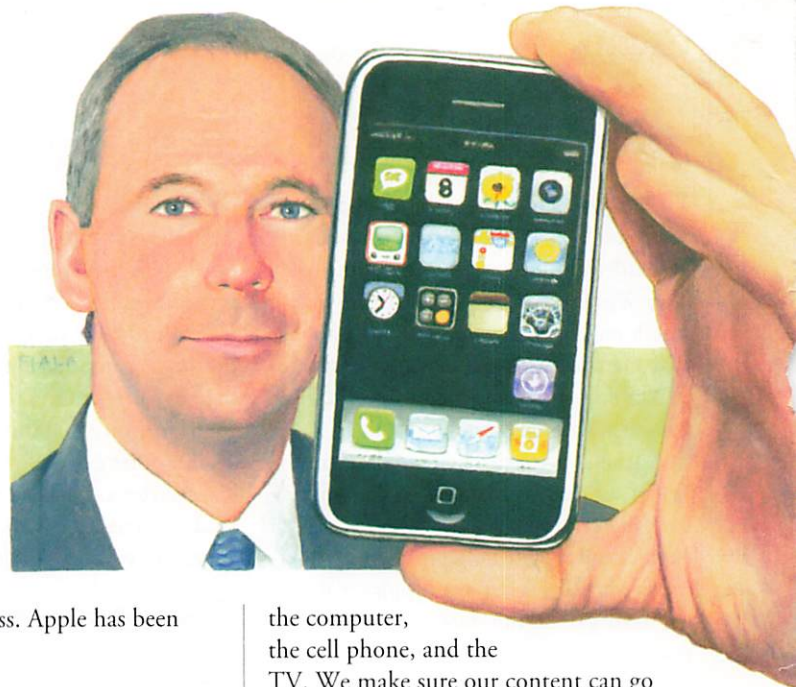
CR We take technology and migrate it across three screens:

the computer, the cell phone, and the TV. We make sure our content can go across the different screens. Finding technologies to enable that integration is hard. We're not going to run multiple networks. We're building an Internet Protocol network to provide broadband IP-based services and converge our assets. We build a single IP core, a single IP network. The access network could be fiber to the curb or fiber to the premises. It could be Wi-Fi, WiMAX, or cellular. But we'll take advantage of broadband technology to deliver our content. This is not just about the digital home. It's a digital lifestyle. So that the content can run on any screen. You want your movies on the device of your choice. It will be the same content. Those are technologies I'm looking for.

Q The exclusive deal with the iPhone was a great boon. Now Apple has a deal with Starbucks, which uses T-Mobile. It seems you lose some value there.

CR Assuming T-Mobile stays in there. The application will work for broadband, but not for voice calls. AT&T has 49,000-plus hotspots with our roaming partners. Those iPhones work at any of those locations. That's more than the number of Starbucks locations. I don't think they're going to get everyone to buy a subscription. ▲

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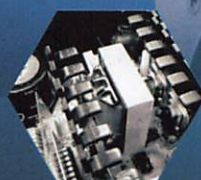
Note : The higher efficiency, the more energy could be used from AC to DC wisely.



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Phone: 760-931-5700 • Fax: 800-722-6555 • www.pcpower.com

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